Excel

YEAR 9

Mathematics Revision & Exam Workbook

Free-to-download sample pages with answers

ESSENTIAL skills

Get the Results You Want!

PASCAL PRESS

AS Kalra

CHAPTER 7
Coordinate geometry

UNIT 1: The distance between two points

QUESTION 1 Write down the distance between each pair of points.

a $A(3, 6)$ and $B(7, 6)$ $AB =$ ______________ **b** $C(5, 2)$ and $D(5, 7)$ $CD =$ ______________

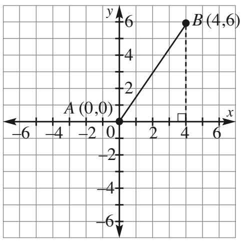
c $E(-3, 5)$ and $F(-3, 0)$ $EF =$ ______________ **d** $G(5, 4)$ and $H(9, 4)$ $GH =$ ______________

e $I(7, 2)$ and $J(11, 2)$ $IJ =$ ______________ **f** $K(-1, 2)$ and $L(2, 2)$ $KL =$ ______________

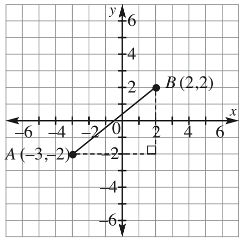
g $M(1, 1)$ and $N(1, 8)$ $MN =$ ______________ **h** $O(4, 4)$ and $P(4, 9)$ $OP =$ ______________

QUESTION 2 Use Pythagoras' theorem to find the distance AB in each diagram. Leave your answers in surd (square root) form where necessary.

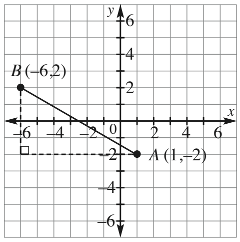
a



b

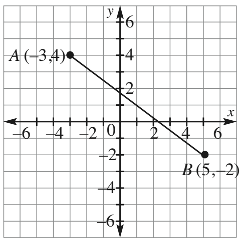


c

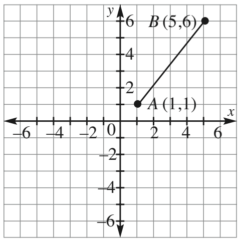


QUESTION 3 Use Pythagoras' theorem to find the length of each interval. Leave your answers in surd form where necessary.

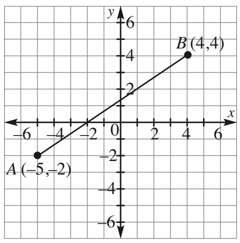
a



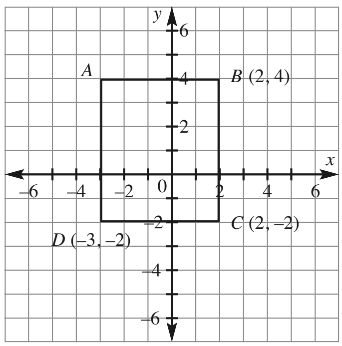
b



c



QUESTION 4 $ABCD$ is a rectangle. Find:



a the coordinates of the vertex A ______________

b the length of the interval

i AB ______________ **ii** BC ______________

iii CD ______________ **iv** DA ______________

v BD ______________ **vi** AC ______________

c The perimeter of $ABCD$ ______________ **d** The area of $ABCD$ ______________

Coordinate geometry

UNIT 2: The distance formula

QUESTION 1 Use the distance formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ to calculate the distance between the following pairs of points. Leave your answers in surd form where necessary.

a $A(1, 3)$ and $B(5, 7)$ **b** $A(4, 2)$ and $B(11, 1)$ **c** $C(-2, 3)$ and $D(5, 2)$

d $E(5, 1)$ and $F(8, 2)$ **e** $G(3, 9)$ and $H(5, 12)$ **f** $I(3, 8)$ and $J(2, 5)$

QUESTION 2 Calculate the distance between the following pairs of points correct to one decimal place.

a $A(5, 8)$ and $B(-1, -2)$ **b** $C(4, 9)$ and $D(9, 5)$ **c** $E(6, 7)$ and $F(0, -2)$

d $G(3, 7)$ and $H(9, 15)$ **e** $I(5, 6)$ and $J(7, 10)$ **f** $K(1, 6)$ and $L(2, 5)$

QUESTION 3

a What is the square of the distance between the points $A(-3, 4)$ and $B(1, 9)$?

b Find the perimeter of the triangle whose vertices are $A(6, 0)$, $B(9, 6)$ and $C(1, 0)$.

QUESTION 4 The points $A(-2, 3)$, $B(5, 3)$, $C(5, -1)$ and $D(-2, -1)$ are the vertices of a rectangle. Find:

a the length AB = ____________ **b** the length BC = ____________

c the length CD = ____________ **d** the length DA = ____________

e the exact length AC = ____________ **f** the exact length BD = ____________

Coordinate geometry

UNIT 3: The midpoint of an interval

Question 1

a What number is halfway between 6 and 10? ______

b What is the average of 6 and 10? ______

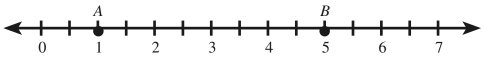
c Find $\frac{6+10}{2}$ ______

d What number is halfway between –2 and 12? ______

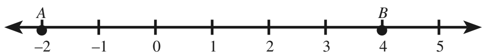
e What is the average of –2 and 12? ______

f Find $\frac{-2+12}{2}$ ______

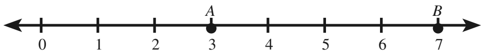
Question 2 What number is halfway between the point A and the point B on each number line?

a 

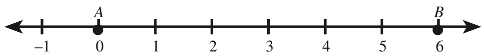
______

b 

______

c 

______

d 

______

Question 3 Find the number that is halfway between:

a 0 and 16 = ______ **b** 4 and 12 = ______ **c** 2 and 10 = ______

d 3 and 15 = ______ **e** 1 and 13 = ______ **f** –1 and 7 = ______

g –2 and 6 = ______ **h** –4 and 4 = ______ **i** 2 and 18 = ______

j –5 and 15 = ______ **k** 3 and 17 = ______ **l** 1 and 19 = ______

Question 4 Consider the points $P(4, 10)$ and $Q(6$ and $-2)$.

a Use the x-coordinates of the points P and Q to find the number halfway between 4 and 6.

______

b Use the y-coordinates of the points P and Q to find the number halfway between 10 and –2.

______

c What are the coordinates of the point M, which is halfway between P and Q?

______

Question 5 If x_1 and x_2 are given, find the value of x when $x = \frac{x_1 + x_2}{2}$

a $x_1 = 3$ and $x_2 = 21$ ______ **b** $x_1 = -2$ and $x_2 = 8$ ______

c $x_1 = 5$ and $x_2 = 13$ ______ **d** $x_1 = 4$ and $x_2 = 10$ ______

e $x_1 = 1$ and $x_2 = 9$ ______ **f** $x_1 = -6$ and $x_2 = 14$ ______

g $x_1 = -4$ and $x_2 = 8$ ______ **h** $x_1 = -6$ and $x_2 = 10$ ______

i $x_1 = -5$ and $x_2 = 7$ ______ **j** $x_1 = -2$ and $x_2 = 16$ ______

k $x_1 = -7$ and $x_2 = -1$ ______ **l** $x_1 = -8$ and $x_2 = -2$ ______

Coordinate geometry

UNIT 4: The midpoint formula

QUESTION 1 Use the midpoint formula $\frac{x_1 + x_2}{2}$ and $\frac{y_1 + y_2}{2}$ to find the midpoint of the interval joining each of the following sets of points.

a $A(0, 6)$, $B(0, 10)$ **b** $A(2, 7)$, $B(8, 9)$ **c** $C(-2, -5)$, $D(-7, 9)$

d $E(4, 9)$, $F(8, 3)$ **e** $G(8, 8)$, $H(6, 0)$ **f** $I(0, 8)$, $J(4, 4)$

QUESTION 2 Use the midpoint formula to find the midpoints of the intervals joining the following points:

a $P(2, -5)$, $Q(8, 5)$ **b** $R(9, 3)$, $S(7, 5)$ **c** $A(5, 13)$, $B(11, 11)$

d $C(4, 5)$, $D(6, 9)$ **e** $E(-3, -6)$, $F(1, 4)$ **f** $G(-4, 6)$, $H(8, -2)$

QUESTION 3 The points $O(0, 0)$, $A(1, 4)$, $B(6, 4)$ and $C(5, 0)$ are the vertices of a parallelogram.

a Find the coordinates of the midpoint of OB. **b** Find the coordinates of the midpoint of AC.

c Are the midpoints of OB and AC the same? ____________________

d What can you say about the diagonals of the parallelogram? ____________________

QUESTION 4 Find the coordinates of the centre of the circle if the endpoints of a diameter are:

a $A(-2, 9)$, $B(9, 6)$ **b** $C(6, 0)$, $D(4, 2)$ **c** $E(3, 11)$, $F(9, 9)$

d $G(5, 6)$, $H(7, 10)$ **e** $I(-5, -8)$, $J(-1, 2)$ **f** $K(-5, 5)$, $L(7, -3)$

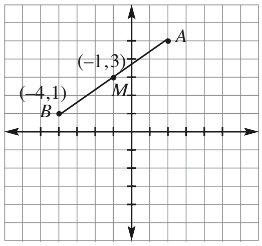
QUESTION 5 The vertices of a triangle ABC are $A(2, 13)$, $B(14, 15)$ and $C(-3, 5)$. Find the midpoint of each side.

QUESTION 6 Prove that the midpoint of $A(5, -8)$ and $B(-5, 8)$ is the origin.

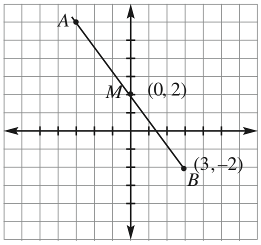
Coordinate geometry

UNIT 5: Finding an end point

Question 1 For each diagram, find the coordinates of A, given that M is the midpoint of AB.

a 

____

b 

____

Question 2 The coordinates of the midpoint M of an interval and one of its end points A, are given. Find the coordinates of the other end point B.

a $M(4, 7)$ and $A(1, 6)$ **b** $M(5, 9)$ and $A(1, 7)$ **c** $M(6, -3)$ and $A(4, 1)$ **d** $M(0, 8)$ and $A(4, 10)$

e $M(5, 9)$ and $A(1, 7)$ **f** $M(4, 3)$ and $A(0, 0)$ **g** $M(3, 9)$ and $A(-1, 5)$ **h** $M(7, 9)$ and $A(4, 5)$

i $M(2, 1)$ and $A(5, -5)$ **j** $M(4, 9)$ and $A(0, 2)$ **k** $M(8, 4)$ and $A(5, 2)$ **l** $M(8, 0)$ and $A(7, 3)$

Question 3 Given the coordinates of the centre C of a circle, and one end point B of a diameter, find the coordinates of the other end point A of the diameter.

a $C(2, 4)$ and $B(0, 1)$ **b** $C(3, 7)$ and $B(2, 6)$ **c** $C(-1, 2)$ and $B(-4, 4)$

d $C(-2, 5)$ and $B(-6, 4)$ **e** $C(0, 0)$ and $B(-4, -6)$ **f** $C(6, 9)$ and $B(4, 6)$

g $C(-1, 8)$ and $B(-4, 3)$ **h** $C(-3, 1)$ and $B(-7, 0)$

Question 4

a (3, 6) is the midpoint of AB and A is the point (0, 2). Find the coordinates of B. ______________

b If the midpoint of (a, b) and (9, 9) is (6, 2). What are the values of a and b? ______________

c If the midpoint of (5, p) and (7, –4) is (6, 3). What is the value of p? ______________

d If the midpoint of (x, 5) and (9, y) is (1, 6). What are the values of x and y? ______________

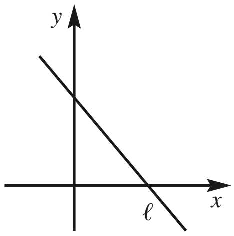
 ISBN 978 1 74125 271 2

Coordinate geometry

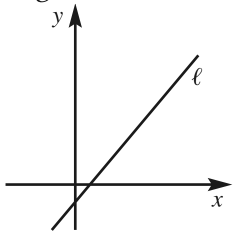
UNIT 6: The gradient of a line

QUESTION 1 State whether the gradient of the line < is positive or negative.

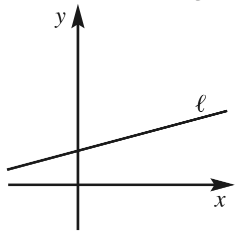
a



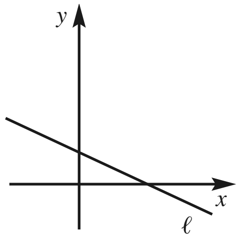
b



c

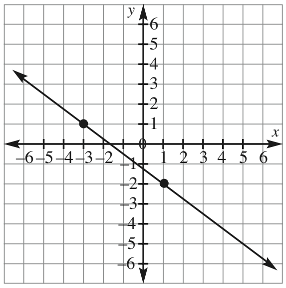


d

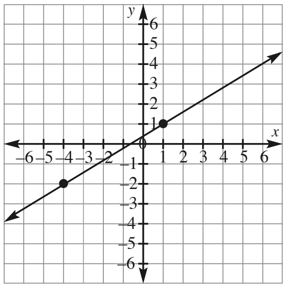


QUESTION 2 Find the gradient of each line.

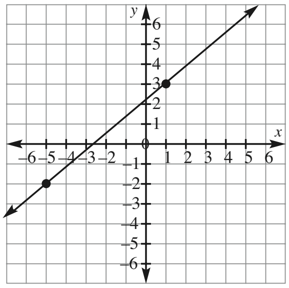
a



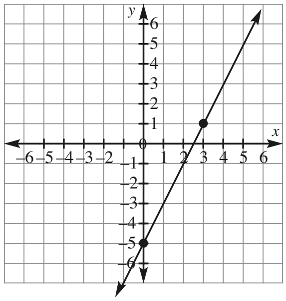
b



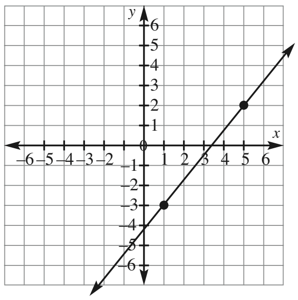
c



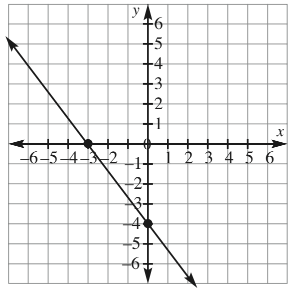
d



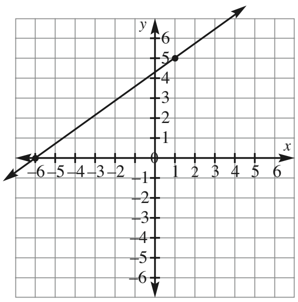
e



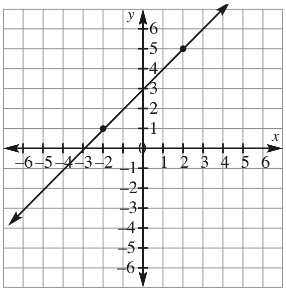
f



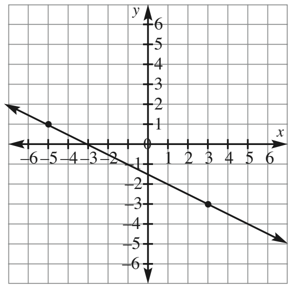
g



h



i



Coordinate geometry

UNIT 7: The gradient formula

QUESTION 1 Use the gradient formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the straight line passing through:

a $A(3, 5)$ and $B(7, -1)$

b $C(2, 5)$ and $D(-2, 1)$

c $E(0, 7)$ and $F(4, 3)$

d $G(1, -1)$ and $H(6, 4)$

e $I(1, 0)$ and $J(4, 9)$

f $K(0, 0)$ and $L(5, 8)$

QUESTION 2 Find the gradient of the line between:

a $A(-2, -3)$ and $B(3, 2)$

b $C(0, 5)$ and $D(5, 0)$

c $E(6, 0)$ and $F(1, -5)$

d $G(5, 5)$ and $H(2, -5)$

e $I(4, 3)$ and $J(1, 4)$

f $K(6, 8)$ and $L(1, -1)$

QUESTION 3 Show that $A(0, -5)$, $B(3, 1)$ and $C(-2, -9)$ are collinear.

QUESTION 4 A line passes through the points $A(1, 3)$ and $B(x, 7)$ and its gradient is 1. Find the value of x.

QUESTION 5 Show that the four points $A(-2, -3)$, $B(-5, 2)$, $C(0, 4)$ and $D(3, -1)$ are the vertices of a parallelogram.

QUESTION 6 Which of the following sets of points is collinear?

a (3, 7), (0, 4) and (8, 2)

b (0, 1), (–1, –1) and (2, 5)

© Pascal Press ISBN 978 1 74125 271 2

Coordinate geometry

UNIT 8: Gradient and *y*-intercept of the line $y = mx + b$

For each of the graphs drawn below, write:

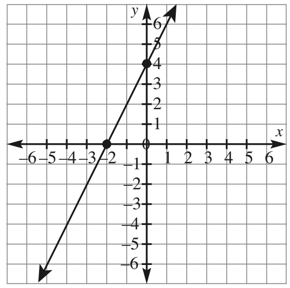
a the *y*-intercept

b the gradient

c whether the gradient is positive or negative

d whether the line is leaning to the right or to the left.

1



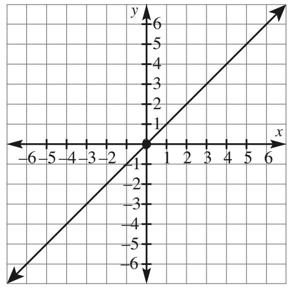
a ____________________

b ____________________

c ____________________

d ____________________

2



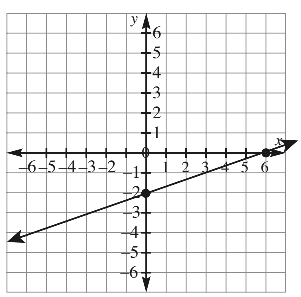
a ____________________

b ____________________

c ____________________

d ____________________

3



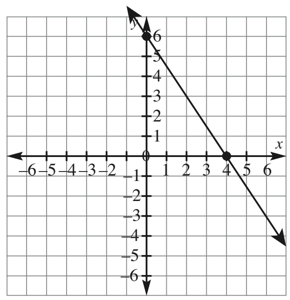
a ____________________

b ____________________

c ____________________

d ____________________

4



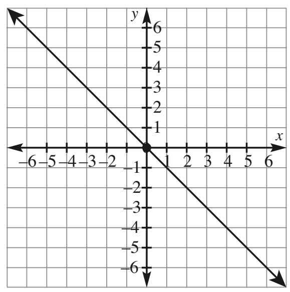
a ____________________

b ____________________

c ____________________

d ____________________

5



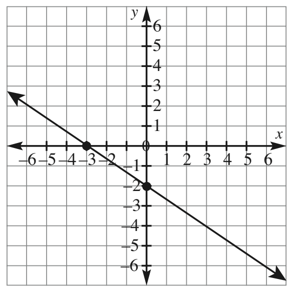
a ____________________

b ____________________

c ____________________

d ____________________

6



a ____________________

b ____________________

c ____________________

d ____________________

UNIT 9: More on gradient and y-intercept of the line $y = mx + b$

For each of the equations given below,

a Complete a table of values.

b Draw the graph of the line.

c Write the gradient of the line.

d State whether it is positive or negative.

e State whether the line is leaning to the left or to the right.

f Write the coefficient of x.

g Is it the same as the gradient?

h Write the y-intercept.

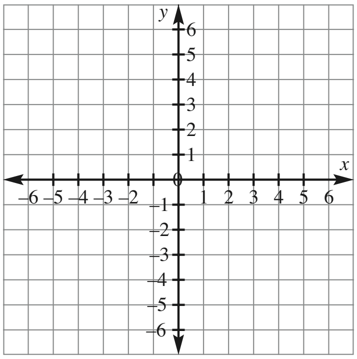
i Is it the same as the constant term of the equation?

Question 1

a $y = x - 3$

x	0	1	2
y			

b



c ______

d ______

e ______

f ______

g ______

h ______

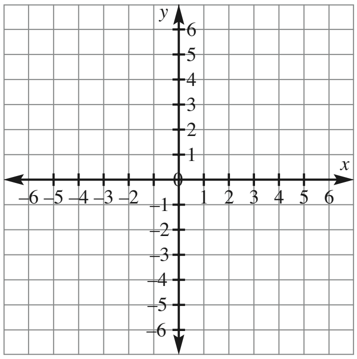
i ______

Question 2

a $y = -2x + 3$

x	0	1	2
y			

b



c ______

d ______

e ______

f ______

g ______

h ______

i ______

Question 3

For each of the lines given below write:
i the gradient **ii** the y-intercept.

a $y = 8x - 5$

i ______

ii ______

b $y = 2x + 3$

i ______

ii ______

c $y = -3x + 7$

i ______

ii ______

© Pascal Press ISBN 978 1 74125 271 2

Coordinate geometry

UNIT 10: Different forms of linear equations

QUESTION 1 Write each of the following equations in general form.

a $3x + 5y = 9$ ______ **b** $2x - y = 7$ ______ **c** $y = 3x - 4$ ______

d $4x - 3y = 8$ ______ **e** $9x - y = 7$ ______ **f** $y = -2x - 6$ ______

g $9x - 5 = 7y$ ______ **h** $4x - 13y = -18$ ______ **i** $y = \frac{x}{5} + 2$ ______

QUESTION 2 Write each of the following equations in the gradient-intercept form.

a $10 + y = 6x$ ______ **b** $4y = 8x + 32$ ______ **c** $3y = -2x + 1$ ______

d $6y - 3x = 12$ ______ **e** $y + 5x = 0$ ______ **f** $9x - 4y = 12$ ______

g $x + y = 2$ ______ **h** $3x - 2y = 7$ ______ **i** $4y = 3x - 8$ ______

QUESTION 3 Write down the gradient (m) and the y-intercept (b) for each of the following.

a $y = 3x + 1$ ______ **b** $y = 9x - 5$ ______ **c** $y = -x - 3$ ______

d $y = -4x + 7$ ______ **e** $y = \frac{2}{3}x - 5$ ______ **f** $y = \frac{1}{4}x - 2$ ______

QUESTION 4 Write the equation of the line in the gradient-intercept form when the gradient (m) and the y-intercept (b) are given.

a $m = 3, b = 2$ ______ **b** $m = 9, b = -3$ ______ **c** $m = -1, b = 7$ ______

d $m = \frac{3}{4}, b = 5$ ______ **e** $m = -\frac{2}{3}, b = 1$ ______ **f** $m = -7, b = 8$ ______

QUESTION 5 Write the equation in the form $y = mx + b$ of the line that passes through the given point and has the given gradient.

a A$(-3, 2)$, $m = 4$ ______ **b** A$(4, -1)$, $m = 2$ ______ **c** A$(1, 5)$, $m = \frac{1}{2}$ ______

d A$(1, 8)$, $m = \frac{2}{3}$ ______ **e** A$(2, 5)$, $m = -\frac{1}{3}$ ______ **f** A$(0, 8)$, $m = -3$ ______

Coordinate geometry

UNIT 11: Determining whether or not a point lies on a line

Question 1

a Show that the point (–2, 3) lies on the line $y = x + 5$

b Does the point (0, –3) lie on the line $3x - 2y = 6$?

c Show that the line $2x - y + 3 = 0$ passes through the points (0, 3), (2, 7) and (–4, –5)

Question 2

State whether the point given after each linear equation lies on that line:

a $2x + y = 4$ (1, 2)

b $3x - y = 6$ (0, –6)

c $y = 4x - 5$ (–1, –9)

d $3x - 4y = 12$ (4, –2)

e $2x + 5y = 10$ (0, 2)

f $y = -2x + 3$ (–2, 1)

Question 3

Does the line pass through the origin (0, 0)?

a $3x - 4y = 12$

b $7x - 2y = 0$

c $9x = 4y$

d $2x - 7y = 8$

e $y = -5x$

f $y = 4x - 7$

Question 4

Find the missing coordinates to make each of the following points satisfy the equation $y = 2x - 5$

a (0,)

b (, –1)

c (3,)

d (–2,)

e (1,)

f (, 5)

Question 5

a If the point (–3, –5) lies on the line $px - y + 4 = 0$ find the value of p

b The straight line $y = mx + 6$ passes through the point (–3, 3). Find the value of m

Coordinate geometry

TOPIC TEST — PART A

Time allowed: 15 minutes — **Total marks: 15**

Marks

1 The gradient of the line that passes through the points (0, 5) and (2, 9) is
(A) 3 (B) –3 (C) 2 (D) 4 — 1

2 The slope of the line $y = \frac{1}{3}x + 5$ is
(A) 5 (B) –5 (C) $\frac{1}{3}$ (D) $-\frac{1}{3}$ — 1

3 The gradient of the line $2x - 5y = 10$ is
(A) 2 (B) 5 (C) $\frac{2}{5}$ (D) $\frac{5}{2}$ — 1

4 The point (9, –1) lies on which of these lines?
(A) $3x + y - 6 = 0$ (B) $3x - y + 6 = 0$ (C) $x + 3y - 6 = 0$ (D) $x + 3y + 6 = 0$ — 1

5 The distance, in units, between the two points A(0, 2) and B(8, 8) is
(A) 6 (B) 8 (C) 10 (D) 12 — 1

6 The equation $2y - 3x = 6$ expressed in general form is
(A) $2y - 3x + 6 = 0$ (B) $2y - 3x - 6 = 0$ (C) $-3x + 2y - 6 = 0$ (D) $3x - 2y + 6 = 0$ — 1

7 The equation $6x - y = 7$ expressed in gradient-intercept form is
(A) $6x = y + 7$ (B) $y = 6x + 7$ (C) $y = 6x - 7$ (D) $y = -6x + 7$ — 1

8 The midpoint of the interval joining the points (1, –3) and (–3, 5) is
(A) (1, –1) (B) (–1, 1) (C) (1, 1) (D) (–1, –1) — 1

9 The gradient of the line represented by the equation $3x - 5y = 5$ is
(A) $\frac{3}{5}$ (B) $\frac{5}{3}$ (C) 3 (D) –5 — 1

10 The distance between the points (2, 8) and (–1, 3) is
(A) $\sqrt{26}$ (B) $\sqrt{122}$ (C) $\sqrt{34}$ (D) $\sqrt{130}$ — 1

11 The line $y = 5x$ passes through which of these points?
(A) (0, –1) (B) (0, 0) (C) (0, 1) (D) (1, 0) — 1

12 Find the distance, in units, between the origin and the point (12, 5)
(A) $\sqrt{119}$ (B) 5 (C) 12 (D) 13 — 1

13 Find the gradient of the line represented by the equation $2x + 2y - \frac{1}{2} = 0$.
(A) $-\frac{1}{2}$ (B) $\frac{1}{2}$ (C) –1 (D) 1 — 1

14 Write $y = 3x - 4$ in general form.
(A) $y - 3x = -4$ (B) $y + 4 = 3x$ (C) $y - 3x + 4 = 0$ (D) $3x - y - 4 = 0$ — 1

15 Write $4y - 3x = 12$ in gradient-intercept form.
(A) $y = \frac{3}{4}x - 3$ (B) $y = \frac{3}{4}x + 3$ (C) $y = -\frac{3}{4}x - 3$ (D) $y = -\frac{3}{4}x + 3$ — 1

Total marks achieved for PART A — /15

Coordinate geometry

TOPIC TEST PART B

Instructions
- This part consists of 15 questions.
- Each question is worth 1 mark.
- Write only the answer in the answer column.
- For any working use the question column.

Time allowed: 20 minutes **Total marks: 15**

Questions	Answers	Marks
1 For the points $A(-2, 6)$ and $B(3, 5)$ find:		
a the distance AB as a square root ________	________	1
b the midpoint of AB ________	________	1
c the gradient of AB ________	________	1
d the equation of the line AB is $x + 5y = 28$ in general form.	________	1
e the equation of the line AB in gradient-intercept form.	________	1
2 **a** What is the distance from $(-2, 7)$ to $(-2, -3)$?	________	1
b Find the square of the distance between the point $A(-3, 5)$ and $B(1, 9)$ ________	________	1
c Find the exact distance between the origin and the point $(4, 8)$ ________	________	1
d Find the midpoint of $(-5, 7)$ and $(5, -7)$ ________	________	1
e The coordinates of the midpoint of AB are $(2, 2)$. If A is the point $(-1, -3)$, what are the coordinates of B? ________	________	1
3 **a** Are the points $A(0, -4)$, $B(1, -2)$ and $C(-3, -10)$ collinear? ________	________	1
b If the end points of the diameter of a circle are $(-3, 4)$ and $(7, 6)$, what are the coordinates of the centre? ________	________	1
c The midpoint of $P(2, 8)$ and $Q(a, b)$ is $M(4, -4)$. Find the coordinates of point Q. ________	________	1
d Which of the points $(-2, -2)$ and $(2, 2)$ lies on the line $y = 5x - 8$?	________	1
e Find the equation of the line that has gradient $-\frac{2}{3}$ and y-intercept of 6.	________	1

Total marks achieved for PART B $\frac{\quad}{15}$

CHAPTER 8
Linear and non-linear relationships

UNIT 1: Tables of values

QUESTION **1** Complete each table of values.

a $y = 2x + 1$

x	y
0	
1	
2	
3	

b $y = 3x + 2$

x	y
–2	
–1	
0	
1	

c $y = 2x – 3$

x	y
–3	
0	
3	
4	

d $y = 5x – 4$

x	y
–1	
0	
4	
5	

e $y = 4x + 1$

x	y
–3	
–1	
1	
3	

f $y = 3x – 8$

x	y
–6	
–4	
0	
2	

QUESTION **2** Complete each of the following:

a $m = 2n – 5$

n	m
–1	
0	
1	
2	

b $a = 3b + 7$

b	a
1	
2	
3	
4	

c $p = 2q + 10$

q	p
–1	
0	
1	
2	

d $s = 3t + 1$

t	s
–1	
0	
1	
2	

e $y = 4x – 7$

x	y
–2	
–1	
0	
1	

f $2x + y = 3$

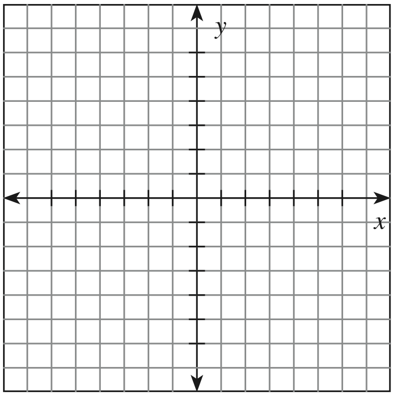
x	y
–2	
–1	
0	
1	

UNIT 2: Graphing points of intersection

QUESTION 1 Graph each pair of lines on the same number plane and find their point of intersection.

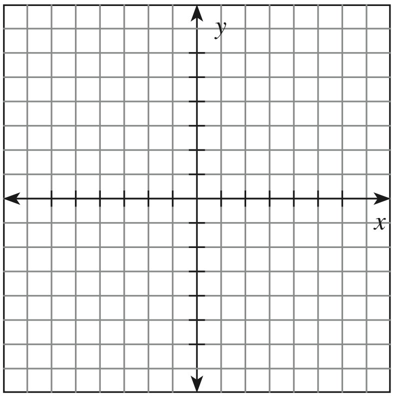
a $x = 2$; $y = 1$

Point of intersection: ____________________



b $x = 4$; $y = -3$

Point of intersection: ____________________



QUESTION 2 Graph each pair of lines on the same number plane and find their point of intersection.

a $y = 2x + 1$; $y = -2x + 1$

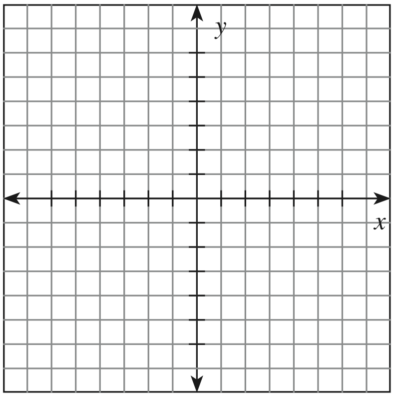
$y = 2x + 1$

x	0	1	2
y			

$y = -2x + 1$

x	0	1	2
y			

Point of intersection: ____________________



b $y = 2x - 1$; $y = x - 2$

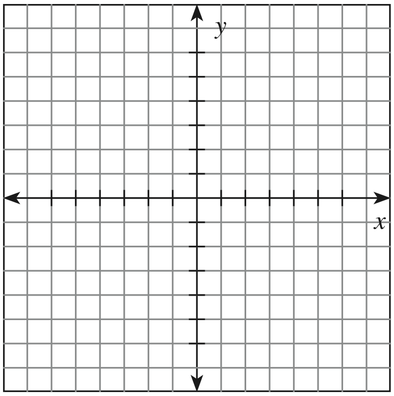
$y = 2x - 1$

x	0	1	2
y			

$y = x - 2$

x	0	1	2
y			

Point of intersection: ____________________

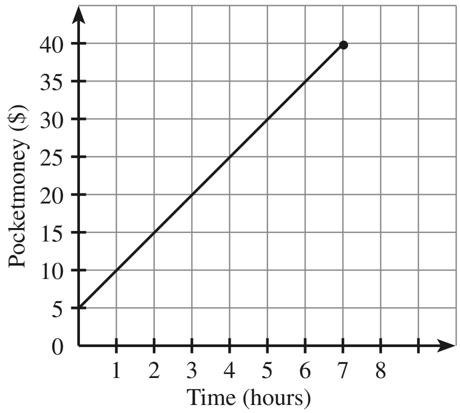


 ISBN 978 1 74125 271 2

Linear and non-linear relationships

UNIT 3: Meaning for gradient and *y*-intercept

QUESTION **1** Andrew receives a fixed amount of pocket money each week. In addition, if Andrew chooses to help his mother, she gives him an extra amount per hour for the time worked. The graph shows the amount of money Andrew might receive in pocket money each week.



a What is the intercept on the vertical axis?

____

____

b What does the intercept on the vertical axis represent?

____

____

c What is the gradient of this line? ______________

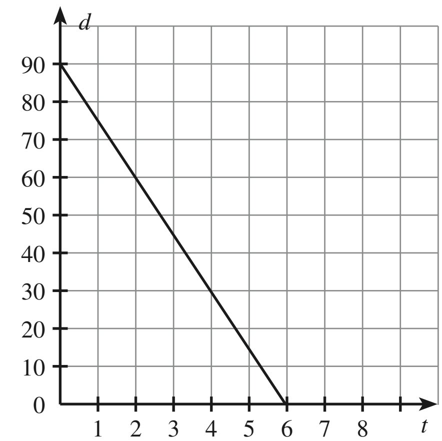
____

____

d What does the gradient represent? ______________

____

QUESTION **2** Melissa intends to ride a bicycle from Baxton to Clair to raise money for the local hospital. The graph shows her expected distance from Clair in kilometres over time (in hours).



a What is the intercept on the vertical axis?

____

____

b What information does this intercept tell us?

____

____

c What is the gradient of the line? ______________

____

____

d What information does the gradient tell us?

____

____

e What is the equation of the line?

____

UNIT 4: General form of linear equations

Question 1 Write each of the following linear equations in general form.

a $2x - 5y = 9$

b $3x + 4y = 8$

c $5x - 7 = 2y$

d $8y - 3 = 4x$

e $2x = 9 - y$

f $y = 8x + 7$

g $3y - 2x = 6$

h $9y = 8x + 12$

i $2y = \frac{x}{3} + 1$

Question 2 Each of the following equations is in general form. Change it to gradient-intercept form, then write down its gradient and y-intercept.

a $2x + 3y - 8 = 0$

b $x + 5y - 7 = 0$

c $3x - 2y - 3 = 0$

d $x - y + 7 = 0$

e $2x + y - 9 = 0$

f $5x - 6y + 11 = 0$

g $3x - 2y - 6 = 0$

h $4x + 5y + 3 = 0$

i $2x - y + 6 = 0$

Question 3 Write the equation of each line in gradient-intercept form and then change it to general form.

a $m = 4\ ,\ b = 3$

b $m = 2\ ,\ b = -5$

c $m = 3\ ,\ b = 7$

d $m = \frac{1}{2}\ ,\ b = 4$

e $m = \frac{2}{3}\ ,\ b = 6$

f $m = -\frac{5}{6}\ ,\ b = 3$

© Pascal Press ISBN 978 1 74125 271 2

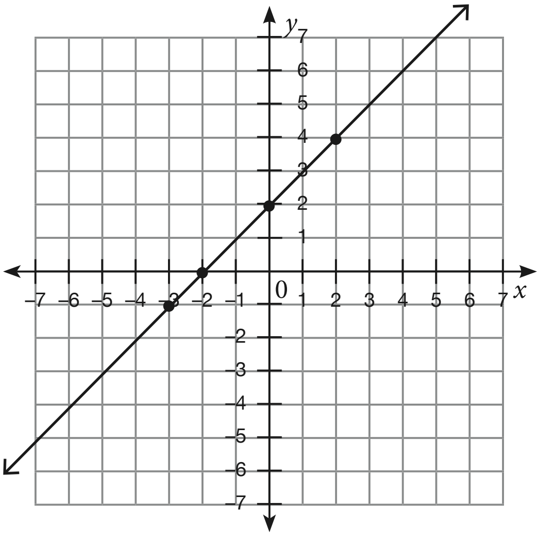
Linear and non-linear relationships

UNIT 5: Using graphs to solve linear equations (1)

QUESTION 1 The graph of $y = x + 2$ is shown opposite. Use the graph to write the y-value for each of the following x-values.

a **i** $x = 3$ **ii** $x = 1$ **iii** $x = -4$

__________ __________ __________



b Use the graph to find the x-value for each of the following y-values.

i $y = 6$ **ii** $y = -3$ **iii** $y = 0$

__________ __________ __________

c In part **b** replace y by $x + 2$ as $y = x + 2$ is the equation of the graph. Use the graph to solve each of the following linear equations.

i $x + 2 = 6$ **ii** $x + 2 = -3$ **iii** $x + 2 = 0$

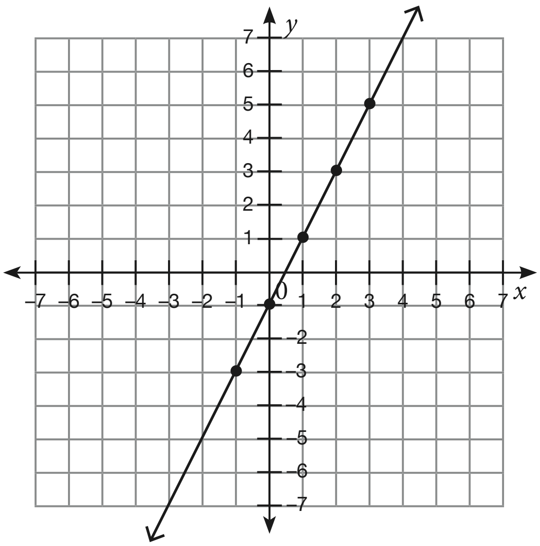
__________ __________ __________

QUESTION 2 The graph of $y = 2x - 1$ is drawn below. Use the graph to solve each of the following equations.

a $2x - 1 = 1$ **b** $2x - 1 = 3$

__________ __________

__________ __________



c $2x - 1 = -3$ **d** $2x - 1 = -5$

__________ __________

__________ __________

e $2x - 1 = 5$ **f** $2x - 1 = 0$

__________ __________

__________ __________

g $2x - 1 = 2$ **h** $2x - 1 = 4$

__________ __________

__________ __________

i $2x - 1 = -2$

____

____

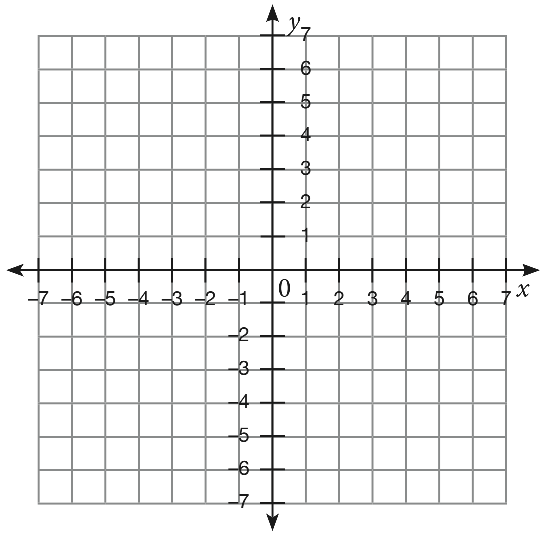
Linear and non-linear relationships

UNIT 6: Using graphs to solve linear equations (2)

Question 1

a Complete the table of values for the relation $y = 3x - 5$

x	0	1	2	3
y				



b Draw the graph of $y = 3x - 5$

c Use the graph to solve the following linear equations.

i $3x - 5 = 1$ **ii** $3x - 5 = 7$

____________   ____________

____________   ____________

iii $3x - 5 = -2$ **iv** $3x - 5 = -8$

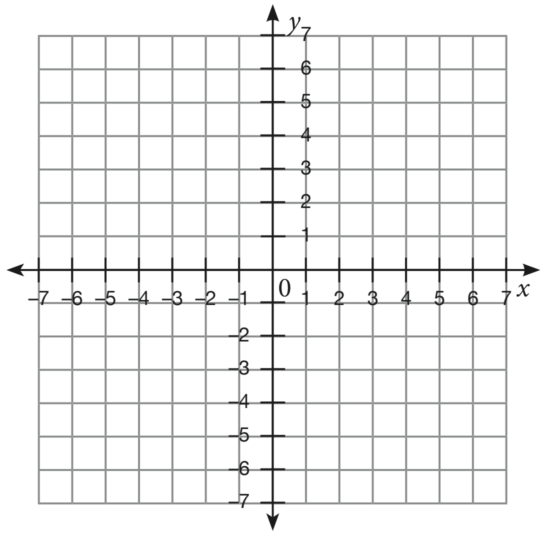
____________   ____________

____________   ____________

Question 2

a Complete the table of values for the relation $y = -2x + 7$

x	–1	0	1	2	3
y					



b Draw the graph of $y = -2x + 7$

c Use the graph to solve the following linear equations.

i $-2x + 7 = 1$ **ii** $-2x + 7 = 3$

____________   ____________

____________   ____________

iii $-2x + 7 = 5$ **iv** $-2x + 7 = -1$

____________   ____________

____________   ____________

v $-2x + 7 = -3$

____

____

Linear and non-linear relationships

UNIT 7: Drawing quadratic relationships

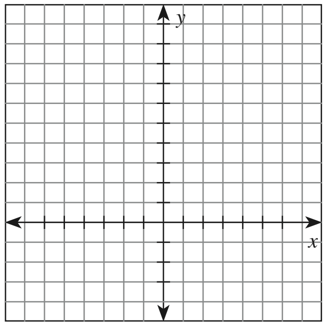
QUESTION 1 Complete the table of values and then, on the same number plane, draw the graphs of the following:

$y = x^2$

$y = 3x^2$

$y = \frac{1}{3}x^2$

	x	–3	–2	–1	0	1	2	3
i	$y = x^2$							
ii	$y = 3x^2$							
iii	$y = \frac{1}{3}x^2$							



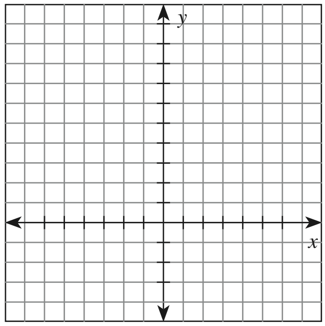
QUESTION 2 Complete the table of values and then, on the same same number plane, draw the graphs of the following:

$y = x^2$

$y = x^2 + 3$

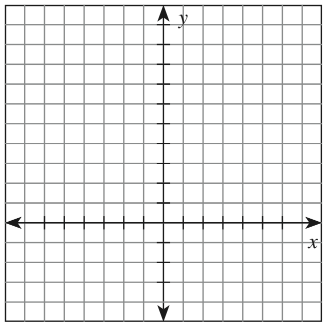
$y = x^2 – 3$

	x	–3	–2	–1	0	1	2	3
i	$y = x^2$							
ii	$y = x^2 + 3$							
iii	$y = x^2 – 3$							



QUESTION 3 Complete the table of values for $y = x^2 + 1$ and sketch its graph.

x	–3	–2	–1	0	1	2	3
$y = x^2 + 1$							



a What is the equation of its axis of symmetry? ______________________

b What are the coordinates of its vertex? ______________________

c What is the minimum value for $y = x^2 + 1$? ______________________

d Find the x-intercepts: ______________________

e Find the y-intercept: ______________________

QUESTION 4 Sketch the graphs of the following on the same number plane.

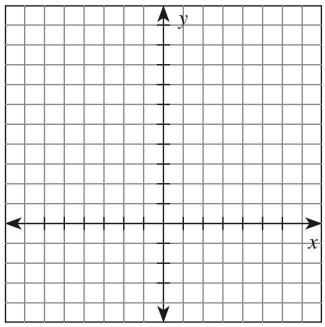
a $y = x^2$

b $y = x^2 + 4$

c $y = x^2 – 4$

d Explain how the graphs of $y = x^2 + 4$ and $y = x^2 – 4$ can be drawn using $y = x^2$ ______________________

____

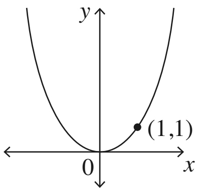


Linear and non-linear relationships

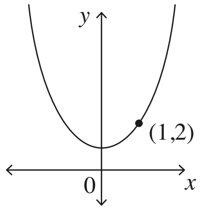
UNIT 8: Further parabolas

QUESTION 1 The equation of each parabola is of the form $y = ax^2 + c$. Use the features of each graph to determine the values of a and c and hence write down the equation.

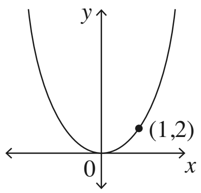
a



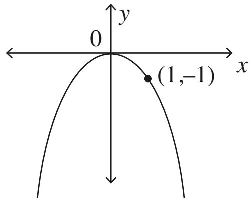
b



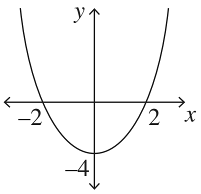
c



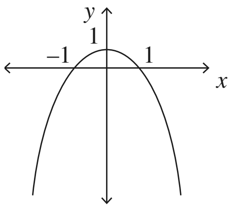
d



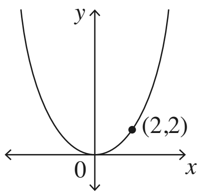
e



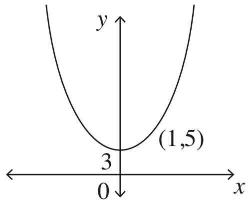
f



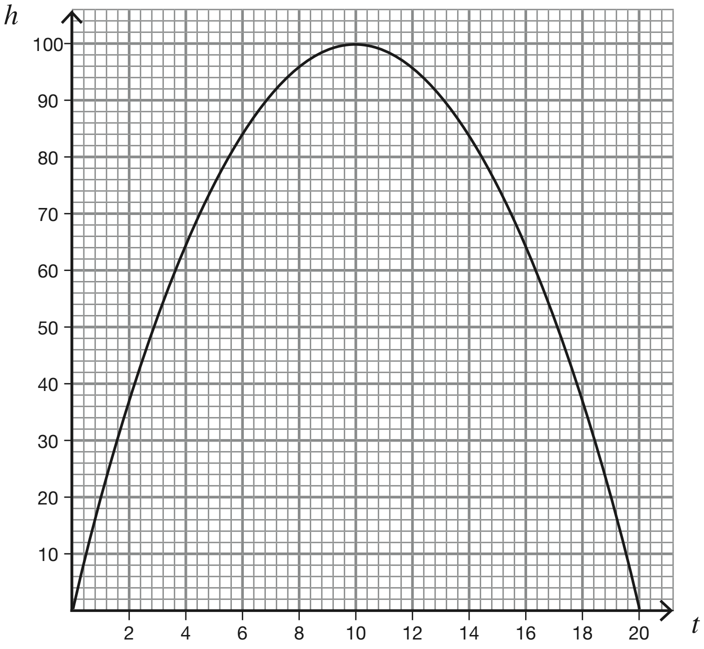
g



h



QUESTION 2 A computer program was used to draw the graph of the height, h m, of a ball fired into the air after t seconds.



a How high is the ball after 4 seconds?

b How high is the ball after 2.8 seconds?

c How high is the ball after 14 seconds?

d What is the maximum height reached by the ball?

e After how many seconds does the ball reach the maximum height?

f When is the ball 30 m high?

and

g After how many seconds does the ball return to the ground?

Linear and non-linear relationships

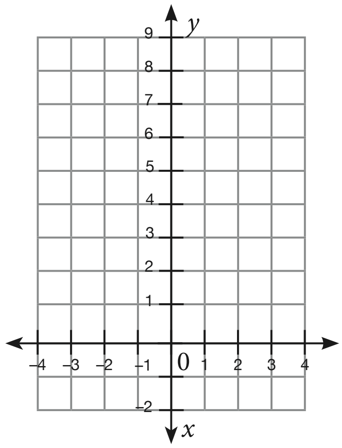
UNIT 9: Exponential curves

QUESTION 1

a Complete the table of values for $y = 2^x$

x	–3	–2	–1	0	1	2	3
y							

b On the number plane provided, sketch the graph of $y = 2^x$



c What happens to the y-value as x becomes very large?

____

d What happens to the y-value as x decreases in value?

____

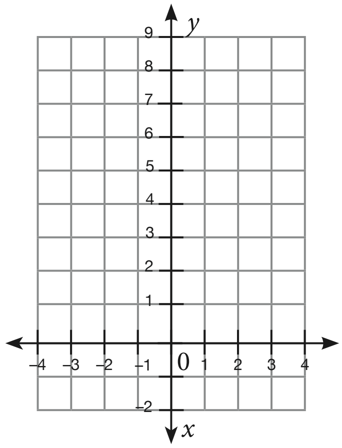
e What is the value of y when $x = 0$? _________________________

QUESTION 2

a Complete the table of values for $y = 3^x$

x	–2	–1	0	1	2
y					

b On the number plane provided, sketch the graph of $y = 3^x$



c Complete the table of values for $y = 3^{-x}$

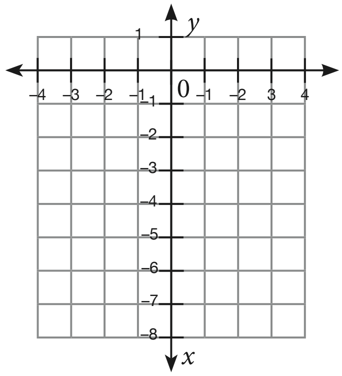
x	–2	–1	0	1	2
y					

d On the same number plane, sketch the graph of $y = 3^{-x}$

e For what value of x does $3^x = 3^{-x}$? _________________________

QUESTION 3

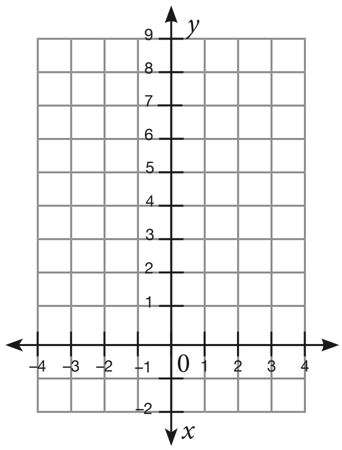
Complete the tables of values and then on the same graph, sketch $y = -2^x$ and $y = -2^{-x}$



	x	–3	–2	–1	0	1	2	3
$y = -2^x$	y							
$y = -2^{-x}$	y							

QUESTION 4

Complete the tables of values and then on the same graph, sketch $y = 2^x$ and $y = 2^x + 1$ and $y = 2^x - 1$

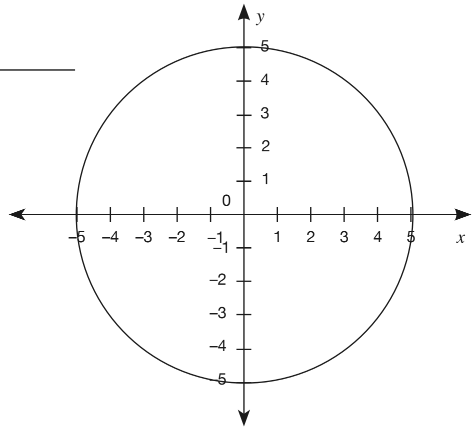


	x	–3	–2	–1	0	1	2	3
$y = 2^x$	y							
$y = 2^x + 1$	y							
$y = 2^x - 1$	y							

Linear and non-linear relationships

UNIT 10: Circles

QUESTION 1



a What are the coordinates of the centre of this circle? ____________________

b What is the radius? ____________________

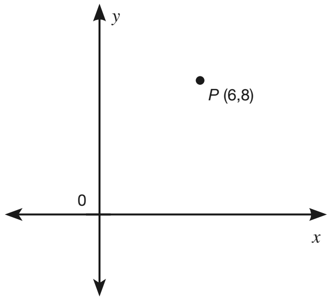
c What is the equation of the circle? ____________________

d The point $P(4, 3)$ lies on the circle. Show that the coordinates of P satisfy the equation.

____

____

QUESTION 2



a Use Pythagoras' theorem to find the distance from (0, 0) to (6, 8).

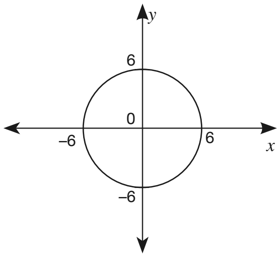
____

b Write down the equation of the circle that has its centre at the origin and passes through P.

____

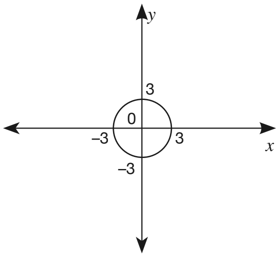
QUESTION 3 Write the equation for each circle.

a



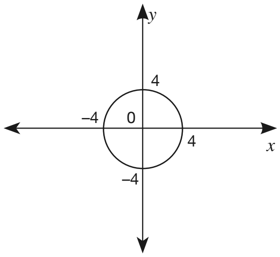
____

b



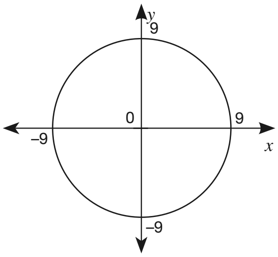
____

c



____

d



____

QUESTION 4 For each equation of a circle write down the centre and the radius.

a $x^2 + y^2 = 4$

____

____

b $x^2 + y^2 = 49$

____

____

c $x^2 + y^2 = 144$

____

____

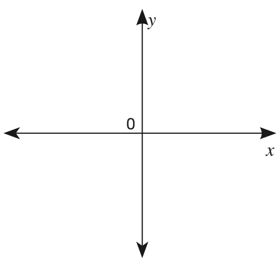
d $x^2 + y^2 = 6.25$

____

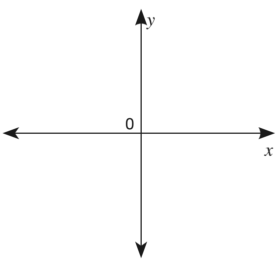
____

QUESTION 5 Sketch the graph of each of these.

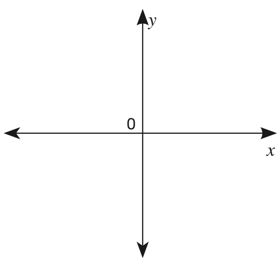
a $x^2 + y^2 = 64$



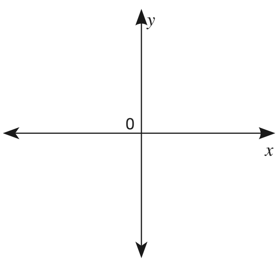
b $x^2 + y^2 = 12.25$



c $x^2 + y^2 = 121$



d $x^2 + y^2 = 1$

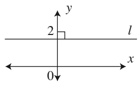


Linear and non-linear relationships

TOPIC TEST — PART A

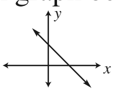
Time allowed: 15 minutes — **Total marks: 12**

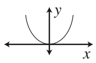
Marks

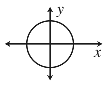
1 The equation of the line < is 

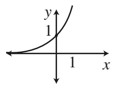
Ⓐ $x = 2$ Ⓑ $x = –2$ Ⓒ $y = 2$ Ⓓ $y = –2$ — 1

2 Which graph best represents $y = x^2$?

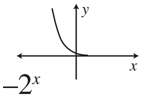
Ⓐ 

Ⓑ 

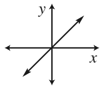
Ⓒ 

Ⓓ 

— 1

3 Which of the following could be the equation of the graph? 

Ⓐ $y = 2^x$ Ⓑ $y = 2^{–x}$ Ⓒ $y = –2^x$ Ⓓ $y = –2^{–x}$ — 1

4 Which of the following could be the equation of the graph? 

Ⓐ $y = 0$ Ⓑ $x = 0$ Ⓒ $y = x$ Ⓓ $y + x = 0$ — 1

5 The equation of a linear graph with y-intercept 5 and gradient 2 is

Ⓐ $y = 2x + 5$ Ⓑ $y = 5x + 2$ Ⓒ $y = 2x – 5$ Ⓓ $y = –2x + 5$ — 1

6 The line $y = 2x – 2$ has

Ⓐ gradient –2, y-intercept 2 Ⓑ gradient 2, y-intercept –2 Ⓒ gradient –2, y-intercept –2 Ⓓ gradient 2, y-intercept 2 — 1

7 Which one of the following points lies on the line $3x – 4y = 12$?

Ⓐ (–3, 8) Ⓑ (–3, –8) Ⓒ (8, 3) Ⓓ (8, –3) — 1

8 For the equation $2x + y = 6$, find the x-intercept.

Ⓐ (0, 6) Ⓑ (6, 0) Ⓒ (0, 3) Ⓓ (3, 0) — 1

9 The coordinates of the point of intersection of the lines $x = 2$ and $y = –3$ are

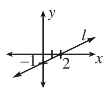
Ⓐ (–3, 2) Ⓑ (3, –2) Ⓒ (–2, 3) Ⓓ (2, –3) — 1

10 The equation $y = 3 – x^2$ represents

Ⓐ a straight line Ⓑ a parabola Ⓒ exponential curve Ⓓ a circle — 1

11 The gradient of the line $y = 3 – x$ is

Ⓐ horizontal Ⓑ vertical Ⓒ negative Ⓓ positive — 1

12 The equation of the line < is 

Ⓐ $x – 2y – 2 = 0$ Ⓑ $x – 2y + 2 = 0$ Ⓒ $2x – y – 2 = 0$ Ⓓ $2x – y + 2 = 0$ — 1

Total marks achieved for PART A — /12

Linear and non-linear relationships

TOPIC TEST PART B

Instructions
- This part consists of 15 questions.
- Each question is worth 1 mark.
- Write only the answer in the answer column.
- For any working use the question column.

Time allowed: 20 minutes **Total marks: 15**

Questions | **Answers** | **Marks**

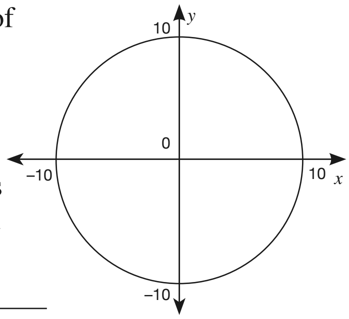
1 **a** What are the coordinates of the centre of this circle?

b What is the radius?

c What is the equation of the circle?

d If the distance from O(0, 0) to P(7, 7) is d units, use Pythagoras' theorem to find the value of d^2.

e Does point P lie inside, on or outside the circle?



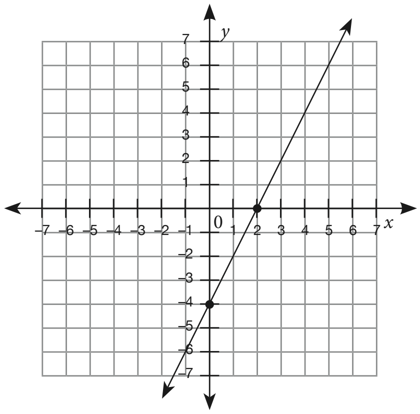
2 **a** Find the gradient of the line <.

b What is its y-intercept?

c Write the equation of the line <.

d Where does the line cut the x-axis?

e For what value of x will $y = 8$?



3 **a** Complete the table of values for $y = x^2 – 4$

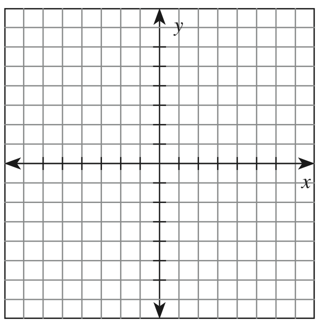
x	–3	–2	–1	0	1	2	3
y							

b Sketch the graph of $y = x^2 – 4$

c What is the equation of its axis of symmetry?

d What are the coordinates of its vertex?

e What are the x-intercepts?



Total marks achieved for PART B /15

© Pascal Press ISBN 978 1 74125 271 2

CHAPTER 9

Equations

UNIT 1: One-step equations (addition and subtraction)

QUESTION 1 Solve the following equations.

a $x + 2 = 9$

b $a + 5 = 16$

c $n - 3 = 7$

d $y + 3 = 7$

e $n + 6 = 8$

f $k - 2 = 15$

g $a + 9 = 21$

h $t + 2 = 5$

i $x - 6 = 8$

j $m + 1 = 10$

k $p + 8 = 11$

l $y - 1 = 5$

QUESTION 2 Solve the following one-step equations.

a $a - 4 = 12$

b $x - 7 = 21$

c $m - 3 = 25$

d $n - 5 = 6$

e $a - 8 = 20$

f $17 + a = 24$

g $y + 9 = 12$

h $t - 8 = -7$

i $y - 3 = -6$

j $x - 5 = 23$

k $9 + p = 25$

l $m - 2 = -12$

QUESTION 3 Solve these equations.

a $a + 8 = 24$

b $x + 4 = 18$

c $b + 3 = 8$

d $k - 6 = 4$

e $n + 6 = 10$

f $a - 1 = 25$

g $m - 7 = 27$

h $t - 3 = 31$

i $y - 4 = 22$

j $x - 9 = 18$

k $a - 6 = 21$

l $14 + x = 51$

QUESTION 4 Solve these equations.

a $3 + x = 18$

b $n + 7 = 12$

c $m - 3 = 14$

d $y - 2 = 10$

e $x - 1 = 12$

f $y + 3 = 19$

g $m - 2 = 12$

h $t - 6 = 2$

i $a - 1\frac{1}{2} = 2\frac{1}{2}$

Equations

UNIT 2: One-step equations (multiplication and division)

Question 1 Solve the following equations.

a $3x = 9$ **b** $4y = 24$ **c** $5t = 15$ **d** $\frac{m}{3} = 6$

e $\frac{n}{2} = 8$ **f** $\frac{a}{5} = 4$ **g** $4x = 20$ **h** $\frac{y}{5} = 2$

i $\frac{x}{4} = 3$ **j** $\frac{x}{4} = 7$ **k** $\frac{x}{2} = 11$ **l** $\frac{t}{3} = -2$

Question 2 Solve the following one-step equations.

a $7a = 56$ **b** $\frac{a}{9} = 2$ **c** $\frac{x}{4} = 10$ **d** $9x = 72$

e $5m = 35$ **f** $\frac{t}{2} = 7$ **g** $\frac{y}{4} = 8$ **h** $\frac{x}{7} = -3$

i $12x = 36$ **j** $\frac{d}{3} = -3$ **k** $5x = 55$ **l** $3t = 15$

Question 3 Solve these equations.

a $\frac{x}{6} = 1$ **b** $\frac{y}{7} = -2$ **c** $\frac{m}{8} = -1$ **d** $9m = -81$

e $6t = 24$ **f** $5n = 35$ **g** $8a = 88$ **h** $\frac{p}{3} = 16$

i $\frac{x}{2} = 7$ **j** $\frac{n}{5} = -14$ **k** $\frac{x}{4} = -6$ **l** $\frac{y}{7} = -8$

Question 4 Solve these equations.

a $\frac{x}{2} = 27$ **b** $2x = 10$ **c** $4x = -48$ **d** $6x = -12$

e $3y = -15$ **f** $\frac{m}{3} = 9$ **g** $\frac{y}{4} = 8$ **h** $\frac{a}{7} = -9$

i $2x = 23$ **j** $3y = 15$ **k** $2x = 15$ **l** $\frac{m}{3} = -11$

UNIT 3: Two-step equations

QUESTION 1 Solve the following two-step equations.

a $3x - 1 = 5$

b $2x + 7 = 17$

c $9y - 4 = 23$

d $6a - 5 = 25$

e $8a + 7 = 47$

f $\frac{3m}{2} = 6$

g $\frac{x-3}{5} = 4$

h $\frac{a}{2} - 4 = 6$

i $3x - 2 = 19$

QUESTION 2 Solve the following equations.

a $3x + 8 = 32$

b $8y - 3 = 21$

c $7p - 8 = 13$

d $\frac{a}{3} - 2 = 9$

e $4a - 2.5 = 9.5$

f $6a + 1\frac{1}{2} = 4\frac{1}{2}$

g $5x - 5 = 30$

h $\frac{x}{2} + 7 = 12$

i $\frac{x-3}{2} = 8$

QUESTION 3 Solve these equations.

a $2y + 5 = 35$

b $7y - 3 = 4$

c $8x - 6 = 26$

d $5t - 2 = 8$

e $m - 34 = 5$

f $2x - 1 = 17$

g $3y + 2 = 5$

h $5y - 4 = 26$

i $2x - 5 = 11$

j $x - 34 = 6$

k $2y + 8 = -2$

l $4p - 6 = -10$

UNIT 4: Equations with pronumerals on both sides

QUESTION 1 Solve the following equations.

a $5a - 9 = 3a + 11$

b $9x + 5 = 7x - 9$

c $2x + 3 = x - 7$

d $6a - 13 = 9a - 15$

e $8t + 11 = 7t - 4$

f $11a + 3 = 9a + 1$

g $4y + 10 = 7y - 2$

h $6a + 9 = 2a - 7$

i $6 - 5t = 9 - 2t$

QUESTION 2 Solve these equations.

a $4m - 11 = 7m - 13$

b $4x + 6 = 5x - 9$

c $6a + 13 = 27 + 3a$

d $5x - 4 = x + 12$

e $10a - 5 = 7a - 2$

f $2x - 20 = 9x - 6$

g $13x - 29 = 31 - 7x$

h $5m - 3 = 4m + 12$

i $x - 15 = 2x + 11$

QUESTION 3 Solve these equations.

a $7x + 15 = -3 - 2x$

b $9a - 20 = 7a + 32$

c $x - 13 = 2x - 12$

d $7x - 28 = 4x - 10$

e $3y + 1 = 2y - 4$

f $9y - 6 = 7y + 10$

g $3y + 8 = 2y + 9$

h $5y - 7 = 4y + 8$

i $12t - 12 = 13t + 33$

j $4t + 7 = 7t + 7$

k $32x + 18 = -20x - 10$

l $5y + 2 = 3y - 8$

m $8a - 9 = 5a + 21$

n $x - 13 = 7x + 5$

o $4x - 5 = 3x + 7$

Equations

UNIT 5: Equations with grouping symbols

QUESTION 1 Solve the following equations.

a $2(x+3)=12$

b $3(y+1)=15$

c $7(m-4)=14$

d $4(x+5)=32$

e $8(2x-1)=64$

f $2(5x-1)=28$

g $6(x-2)=18$

h $-2(3x-1)=20$

i $-3(y+1)=15$

QUESTION 2 Solve these equations.

a $2(4x-3)=30$

b $5(m-4)=35$

c $3(2t+1)=21$

d $-3(p-4)=21$

e $5(2x+3)=25$

f $5(a+4)=4(a-3)$

g $6(2x-1)=5(x+3)$

h $4(a-2)=3(a+2)$

i $6(x-8)=5(x-1)$

QUESTION 3 Solve these equations.

a $6(m+3)+m+12=0$

b $4(x-3)=3(x+2)$

c $5(4a+1)=2a+3$

d $5(a+3)=4(7+a)$

e $8(m-1)=7(m-3)$

f $9(t+2)=7(t+3)$

g $5(a+1)+2a+7=33$

h $5(n+3)=4(n-1)$

i $4(5a-3)=38$

j $7(x-8)=-28$

k $8(y-3)=7(y+1)$

l $5(a+4)=4(a-2)$

Equations

TOPIC TEST — PART A

Time allowed: 15 minutes **Total marks: 15**

Marks

1 If $2x - 3 = 17$ then x equals
(A) 7 (B) 10 (C) 14 (D) 20 — 1

2 If $\frac{m}{3} - 2 = 4$ then m equals
(A) 2 (B) 6 (C) 14 (D) 18 — 1

3 If $5x - 3 = 60$, what is the value of x?
(A) 12 (B) 57 (C) 63 (D) $\frac{63}{5}$ — 1

4 If $4(3m - 5) = 6m - 14$ then m equals
(A) 2 (B) 1 (C) -2 (D) -1 — 1

5 Solve for x, $2x - 5 = 23$
(A) 8 (B) 9 (C) 14 (D) 28 — 1

6 Solve $4(x - 2) - 3(x - 1) = 0$
(A) -5 (B) 5 (C) -11 (D) 11 — 1

7 Solve $5(x - 1) - 1 = 24$
(A) 5 (B) 6 (C) 10 (D) 26 — 1

8 If $12x - 4 = 8$, then x is equal to
(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) 1 (D) -1 — 1

9 Solve $\frac{x-2}{5} = 4$.
(A) 6 (B) 20 (C) 22 (D) 30 — 1

10 When $2(a + 3) = 10$, the value of a is
(A) 2 (B) 5 (C) 7 (D) 8 — 1

11 Three more than twice the number equals the number plus 7. What is the number?
(A) 2 (B) 4 (C) 5 (D) 10 — 1

12 Find the value of x in the equation $3x - 75 = 0$
(A) 3 (B) 5 (C) 25 (D) 75 — 1

13 Given that $P = 2L + 2B$, find L when $P = 50$ and $B = 15$
(A) 10 (B) 20 (C) 25 (D) 30 — 1

14 Find the solution of $\frac{x+3}{2} = 8$
(A) $x = 16$ (B) $x = 13$ (C) $x = -16$ (D) $x = -13$ — 1

15 The solution of $x + 5 = 4$ is
(A) $x = 1$ (B) $x = 9$ (C) $x = -1$ (D) $x = -9$ — 1

Total marks achieved for PART A /15

Equations

TOPIC TEST — PART B

Instructions
- This part consists of 15 questions.
- Each question is worth 1 mark.
- Write only the answer in the answer column.
- For any working use the question column.

Time allowed: 20 minutes **Total marks: 15**

Questions	Answers	Marks
1 Solve the following equations.		
a $x - 11 = 24$		1
b $x + 3 = 10$		1
c $\frac{y}{8} = -9$		1
d $\frac{m}{2} - 8 = 16$		1
e $4x^2 - 12 = 0$		1
f $3(x + 2) = 5$		1
g $5p - 7 = 4p + 8$		1
h $\frac{8x - 5}{3} = -2$		1
i $\frac{4x}{9} = 5 + x$		1
j $20 = \frac{3x - 7}{4}$		1
k $5(3x - 2) = 3(2x - 10)$		1
l $4m - 3(m + 2) = 9$		1
2 15 more than 4 times a number equals the number plus 45. What is the number?		1
3 Given that $S = \frac{n}{2}(a + l)$, find:		
a S when $n = 20$, $a = 6$ and $l = 240$		1
b n when $S = 680$, $a = 5$ and $l = 75$		1

Total marks achieved for PART B ___ / 15

© Pascal Press ISBN 978 1 74125 271 2

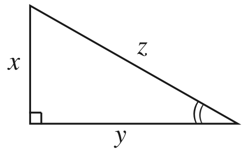
Chapter 10

Trigonometry

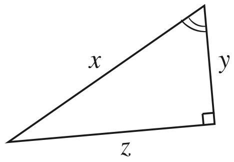
UNIT 1: Naming the sides of a right-angled triangle

Question 1 In each of the following triangles, state whether x, y and z are the opposite side, adjacent side or hypotenuse, with reference to the angle marked.

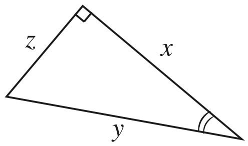
a



b

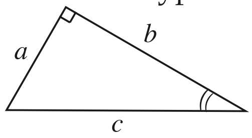


c

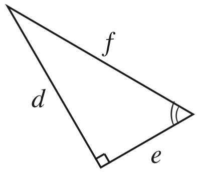


Question 2 Name each side of the following triangles as opposite (opp), adjacent (adj) or hypotenuse (hyp), with reference to the angle marked.

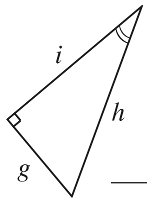
a



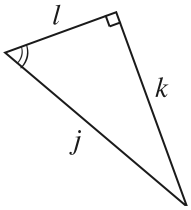
b



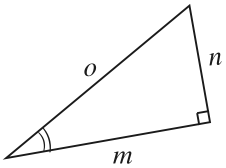
c



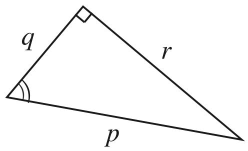
d



e

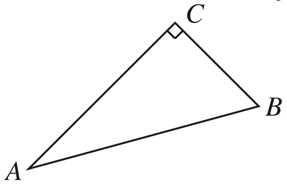


f

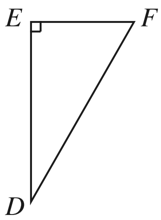


Question 3 Name the hypotenuse in each triangle.

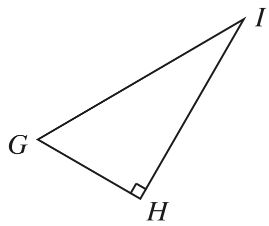
a



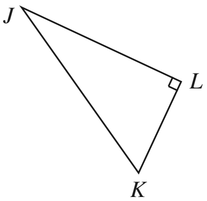
b



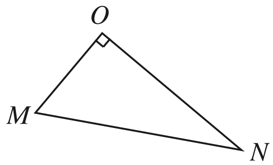
c



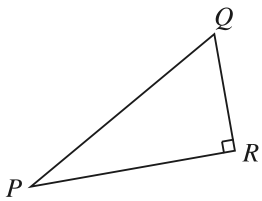
d



e



f

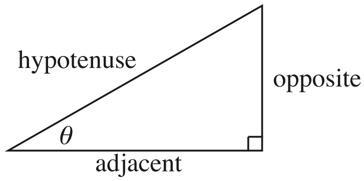


© Pascal Press ISBN 978 1 74125 271 2

Trigonometry

UNIT 2: The trigonometric ratios (1)

QUESTION 1 Complete the following by writing the correct ratio.

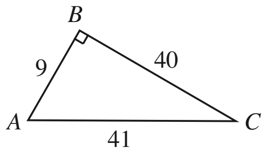


a ______________ $\theta = \frac{\text{opposite}}{\text{hypotenuse}}$ **b** ______________ $\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

c ______________ $\theta = \frac{\text{opposite}}{\text{adjacent}}$

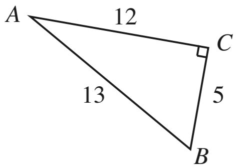
QUESTION 2 For each triangle write value of sin A as a fraction. All lengths are in millimetres.

a



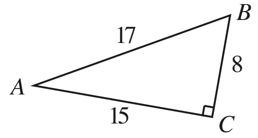
sin A = ______________

b



sin A = ______________

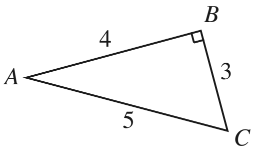
c



sin A = ______________

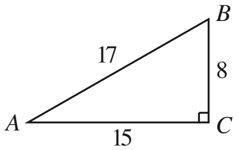
QUESTION 3 Find the value of cos A in each triangle as a fraction. All lengths are in millimetres.

a



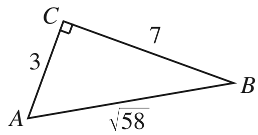
cos A = ______________

b



cos A = ______________

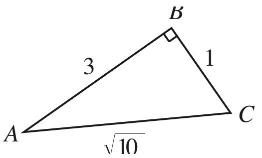
c



cos A = ______________

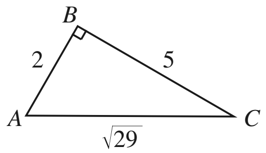
QUESTION 4 Find the value of tan A in each triangle as a fraction. All lengths are in millimetres.

a



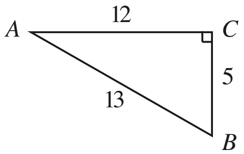
tan A = ______________

b



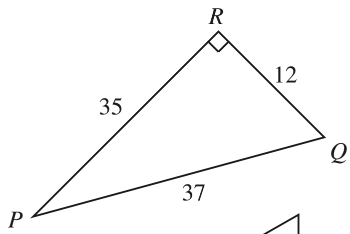
tan A = ______________

c



tan A = ______________

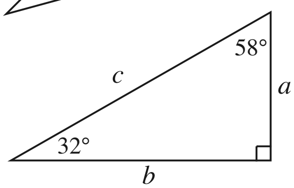
QUESTION 5 Write as fractions.



a sin P = __________ **b** cos Q = __________ **c** tan Q = __________

d cos P = __________ **e** sin Q = __________ **f** tan P = __________

QUESTION 6 Complete:



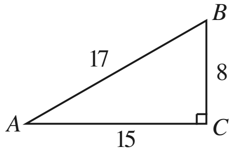
a tan 32° = __________ **b** sin 58° = __________ **c** cos 32° = __________

d cos 58° = __________ **e** tan 58° = __________ **f** sin 32° = __________

UNIT 3: The trigonometric ratios (2)

QUESTION 1 Name the angle of each triangle that has the given sine ratio.

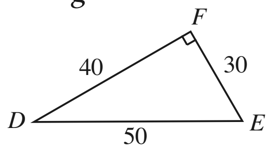
a



$\sin \square = \frac{8}{17}$

$\sin \square = \frac{15}{17}$

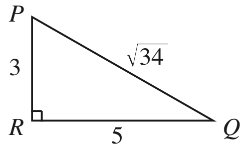
b



$\sin \square = \frac{30}{50}$

$\sin \square = \frac{40}{50}$

c

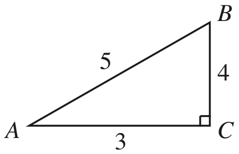


$\sin \square = \frac{5}{\sqrt{34}}$

$\sin \square = \frac{3}{\sqrt{34}}$

QUESTION 2 Name the angle of each triangle that has the given cosine ratio.

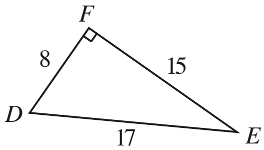
a



$\cos \square = \frac{4}{5}$

$\cos \square = \frac{3}{5}$

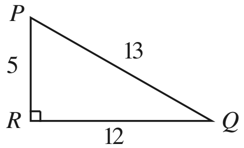
b



$\cos \square = \frac{8}{17}$

$\cos \square = \frac{15}{17}$

c

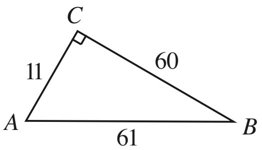


$\cos \square = \frac{5}{13}$

$\cos \square = \frac{12}{13}$

QUESTION 3 Name the angle of each triangle that has the given tangent ratio.

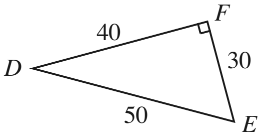
a



$\tan \square = \frac{60}{11}$

$\tan \square = \frac{11}{60}$

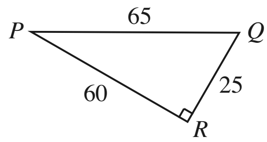
b



$\tan \square = \frac{30}{40}$

$\tan \square = \frac{40}{30}$

c

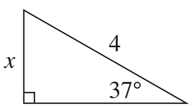


$\tan \square = \frac{25}{60}$

$\tan \square = \frac{60}{25}$

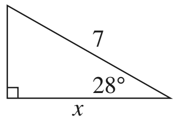
QUESTION 4 Write the correct trig ratio to complete these statements.

a



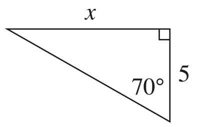
__________ $37° = \frac{x}{4}$

b



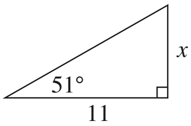
__________ $28° = \frac{x}{7}$

c



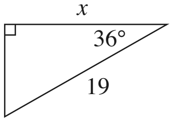
__________ $70° = \frac{x}{5}$

d



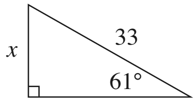
__________ $51° = \frac{x}{11}$

e



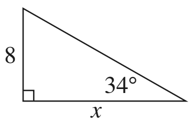
__________ $36° = \frac{x}{19}$

f



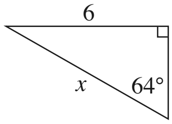
__________ $61° = \frac{x}{33}$

g



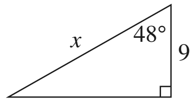
__________ $34° = \frac{8}{x}$

h



__________ $64° = \frac{6}{x}$

i



__________ $48° = \frac{9}{x}$

UNIT 4: Use of a calculator in trigonometry

QUESTION 1 Find the value of the following correct to two decimal places.

a $\sin 34° =$ ________ **b** $\tan 70° =$ ________ **c** $\cos 15° =$ ________

d $\cos 59° =$ ________ **e** $\cos 40° =$ ________ **f** $\sin 38° =$ ________

g $\tan 83° =$ ________ **h** $\sin 30° =$ ________ **i** $\tan 64° =$ ________

QUESTION 2 Find the value of the following correct to three decimal places.

a $\frac{\sin 35°}{2} =$ ________ **b** $\frac{\cos 64°}{8} =$ ________ **c** $\frac{18.9}{\cos 35°} =$ ________

d $\frac{\cos 38°42'}{2.5} =$ ________ **e** $\frac{\sin 29°43'}{8.4} =$ ________ **f** $\frac{20.5}{\sin 53°27'} =$ ________

g $\frac{\tan 29°18'}{7.25} =$ ________ **h** $\frac{\tan 68°25'}{7.1} =$ ________ **i** $\frac{829}{\tan 28°15'} =$ ________

QUESTION 3 Find the value of the following correct to three significant figures.

a $3.9 \tan 23° =$ ________ **b** $\tan 56°8' =$ ________ **c** $\cos 35°29' =$ ________

d $7 \sin 35° =$ ________ **e** $\sin 25°19' =$ ________ **f** $\sin 69°18' =$ ________

g $\cos 61°38' =$ ________ **h** $8.4 \cos 65°23' =$ ________ **i** $\tan 23°46' =$ ________

QUESTION 4 A is an acute angle. Find its size to the nearest degree.

a $\sin A = 0.6325$ ________ **b** $\cos A = 0.3787$ ________ **c** $\tan A = 2.538$ ________

d $\cos A = 0.5783$ ________ **e** $\tan A = 0.7938$ ________ **f** $\sin A = 0.7613$ ________

g $\tan A = 1.6928$ ________ **h** $\sin A = 0.2831$ ________ **i** $\cos A = 0.9852$ ________

QUESTION 5 A is an acute angle. Find its size to the nearest degree.

a $\sin A = 0.5$ ________ **b** $\tan A = 0.5832$ ________ **c** $\sin A = 0.7681$ ________

d $\cos A = 0.3876$ ________ **e** $\cos A = 0.5$ ________ **f** $\tan A = 2.1075$ ________

QUESTION 6 Find the size of the acute angle B to the nearest degree.

a $\tan B = \frac{16}{23}$ ________ **b** $\cos B = \frac{5}{13}$ ________ **c** $\sin B = \frac{8.3}{14.5}$ ________

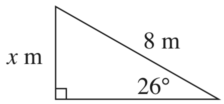
d $\sin B = \frac{1}{2}$ ________ **e** $\tan B = \frac{8}{9}$ ________ **f** $\cos B = \frac{11.3}{14.8}$ ________

Trigonometry

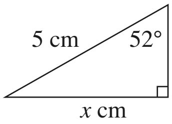
UNIT 5: Using trigonometric ratios to find sides

QUESTION 1 Use the sine ratio to find the value of x to one decimal place.

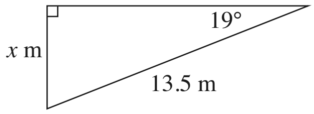
a



b

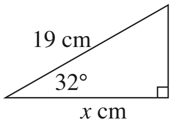


c

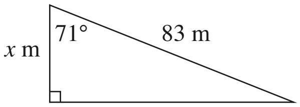


QUESTION 2 Use the cosine ratio to find the value of x to one decimal place.

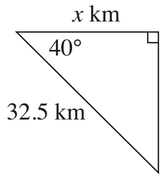
a



b

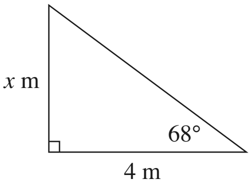


c

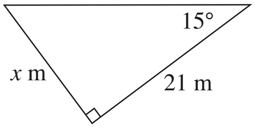


QUESTION 3 Use the tangent ratio to find the value of x to one decimal place.

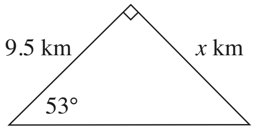
a



b

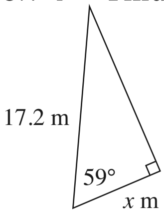


c

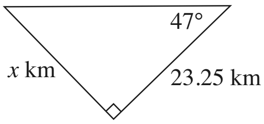


QUESTION 4 Find the value of x to two decimal places.

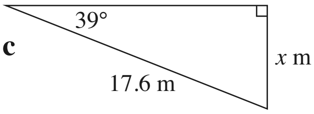
a



b



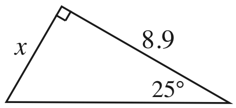
c



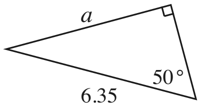
UNIT 6: Finding an unknown side

QUESTION 1 Find the value of the unknown side correct to one decimal place.

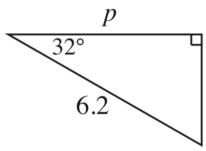
a



b

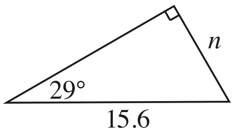


c

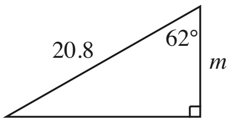


QUESTION 2 Find the value of the pronumeral in the following triangles correct to two decimal places.

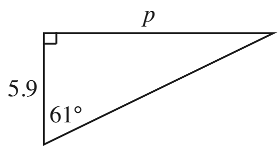
a



b

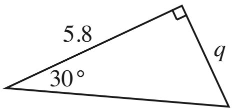


c

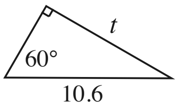


QUESTION 3 Find the value of the pronumeral correct to two decimal places.

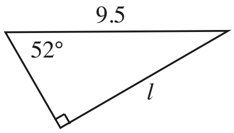
a



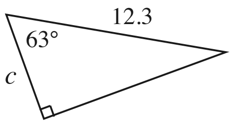
b



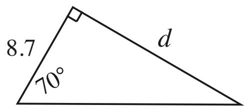
c



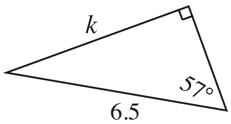
d



e



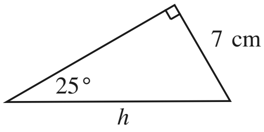
f



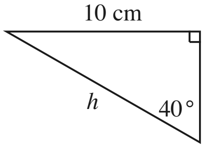
UNIT 7: Finding the hypotenuse

QUESTION 1 Find the length of the hypotenuse correct to one decimal place.

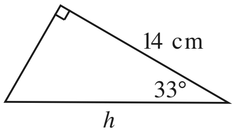
a



b

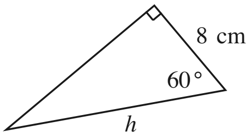


c

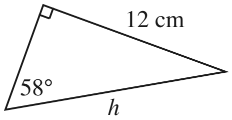


QUESTION 2 Find the length of the hypotenuse correct to two decimal places.

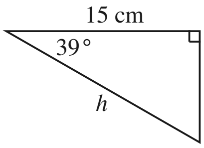
a



b

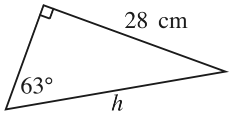


c

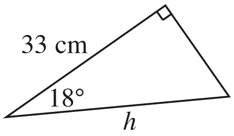


QUESTION 3 Find the length of the hypotenuse correct to one decimal place.

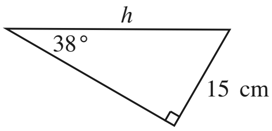
a



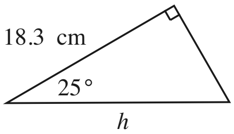
b



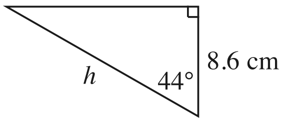
c



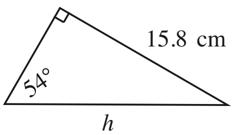
d



e



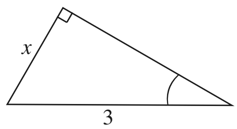
f



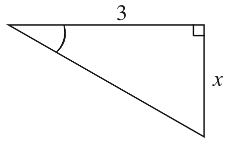
UNIT 8: Mixed questions on finding sides

QUESTION 1 Which ratio (sin, cos or tan) would be the best to use to find the value of x if the size of the marked angle was known?

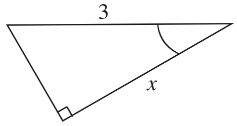
a



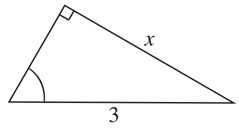
b



c

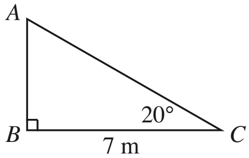


d

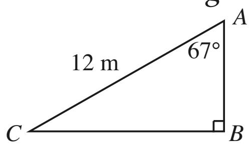


QUESTION 2 Find the length of side AB of each triangle correct to one decimal place.

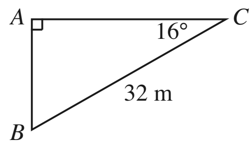
a



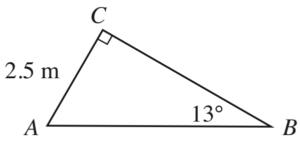
b



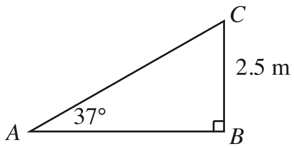
c



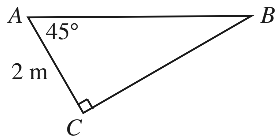
d



e

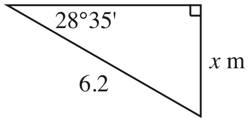


f

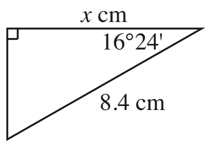


QUESTION 3 Find the value of x to two decimal places.

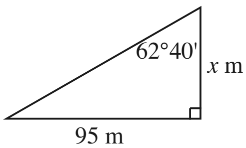
a



b



c

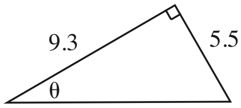


© Pascal Press ISBN 978 1 74125 271 2

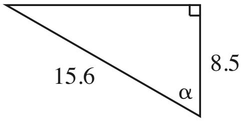
UNIT 9: Finding an unknown angle

QUESTION 1 Find the size of the angle marked with the pronumeral to the nearest degree.

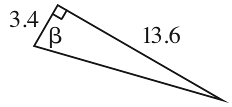
a



b

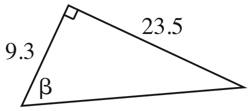


c

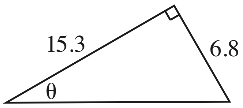


QUESTION 2 Find the size of the angle marked to the nearest degree.

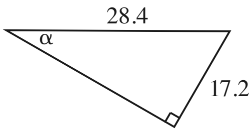
a



b

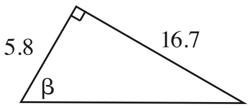


c

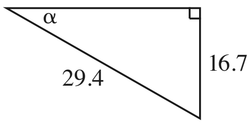


QUESTION 3 Find the size of the angle marked to the nearest degree.

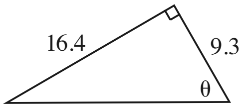
a



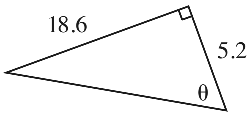
b



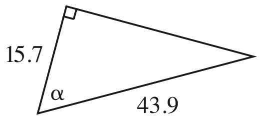
c



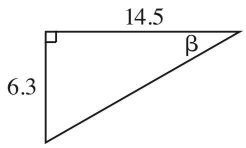
d



e

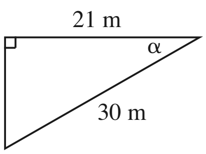


f

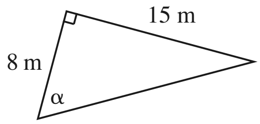


QUESTION 4 Find the size of the marked angle. Give the answer to the nearest minute.

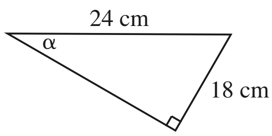
a



b



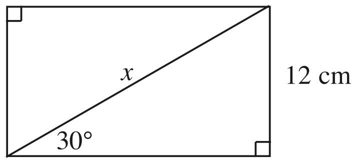
c



UNIT 10: Problem solving

QUESTION 1 A piece of wood 2.5 m long leans against a vertical wall, making an angle of 51° with the floor. How far up the wall, to the nearest centimetre, is the top of the wooden piece?

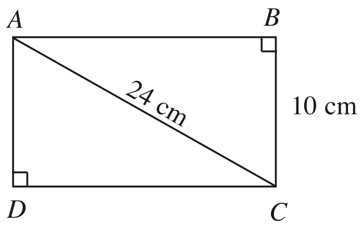
QUESTION 2 Find the value of x.



QUESTION 3 In ΔPQR, $\angle R = 90°$, $QR = 8.2$ cm and $PR = 6.7$ cm, find $\angle P$ to the nearest degree.

QUESTION 4 In ΔPQR, $\angle R = 90°$, $\angle P = 48°$ and $PQ = 8.6$ cm, find PR correct to two decimal places.

QUESTION 5 $ABCD$ is a rectangle with $AC = 24$ cm and $AD = 10$ cm. Find $\angle ACD$ correct to the nearest degree.



QUESTION 6 In ΔABC, $\angle A = 90°$, $\angle B = 58°$ and $AB = 23$ m, find BC correct to the nearest metre.

Trigonometry

TOPIC TEST — PART A

Time allowed: 15 minutes — **Total marks: 15**

Marks

1 Use your calculator to find cos 48° correct to two decimal places.
(A) 0.74 (B) 1.11 (C) 0.67 (D) none of these — 1

2 Evaluate 25 tan 63° correct to two decimal places.
(A) 1.96 (B) 49.07 (C) 29.38 (D) 22.28 — 1

3 Find the value of $\frac{\cos 32°}{43.27}$ correct to two decimal places.
(A) 0.01 (B) 0.02 (C) 0.03 (D) 0.0196 — 1

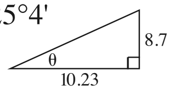
4 If $\sin \theta = \frac{5}{9}$, calculate the size of angle θ to the nearest degree.
(A) 33° (B) 34° (C) 35° (D) 36° — 1

5 sin 56°45' is closest to
(A) 0.8334 (B) 0.8363 (C) 0.7071 (D) 0.7185 — 1

6 If $\cos \theta = \frac{1}{2}$, find the size of angle θ
(A) 30° (B) 45° (C) 60° (D) 72° — 1

7 28.65° equals
(A) 29°5' (B) 28°39' (C) 29°39' (D) 28°5' — 1

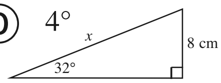
8 If $\tan \theta = 0.468$ then, to the nearest minute, $\theta =$
(A) 25°8' (B) 25°7' (C) 25°5' (D) 25°4' — 1



9 Find the size of angle θ to the nearest degree.
(A) 40° (B) 41° (C) 42° (D) 58° — 1

10 In a $\triangle ABC$, the angle B is 90°, AB is 8 m and AC is 10 m. Find the size of angle A correct to the nearest degree.
(A) 36° (B) 37° (C) 53° (D) 39° — 1

11 A road rises uniformly 30.6 m for every 600 m along the road. Find the angle of elevation of this road correct to the nearest degree.
(A) 1° (B) 2° (C) 3° (D) 4° — 1



12 Find the hypotenuse of this triangle in centimetres correct to 1 decimal place.
(A) 9 cm (B) 15.1 cm (C) 12.8 cm (D) none of these — 1

13 Use your calculator to find 7.9 cos 63° correct to three significant figures.
(A) 3.58 (B) 3.59 (C) 7.03 (D) 7.04 — 1

14 Evaluate $\frac{\sin 54°}{28.65}$ correct to two decimal places.
(A) 0.02 (B) 0.03 (C) 0.04 (D) 0.05 — 1

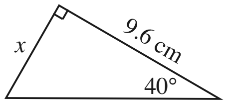
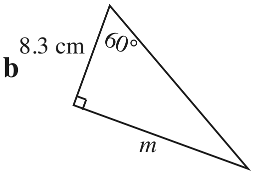
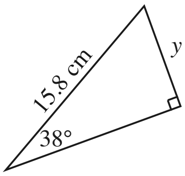
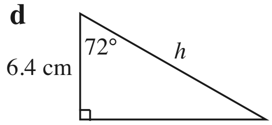
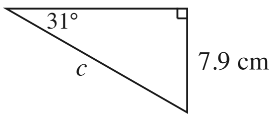
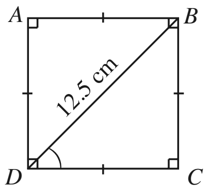
15 Find the size of the acute angle θ to the nearest degree if $\tan \theta = \frac{12.5}{19.34}$
(A) 40° (B) 32° (C) 33° (D) none of these — 1

Total marks achieved for PART A — /15

TOPIC TEST **PART B**

Instructions
- This part consists of 15 questions.
- Each question is worth 1 mark.
- Write only the answer in the answer column.
- For any working use the question column.

Time allowed: 20 minutes **Total marks: 15**

Questions	Answers	Marks
1		
a Find the value of each expression correct to two decimal places.		
i $\frac{\cos 72°}{8.93}$ = ______	______	1
ii $\frac{72.54}{\tan 68°}$ = ______	______	1
iii $\frac{34.20}{\sin 56°}$ = ______	______	1
b Find acute angle A to the nearest degree.		
i $\sin A = 0.6835$ ______	______	1
ii $\tan A = 1.4862$ ______	______	1
2 Find the value of the pronumeral in each triangle correct to two decimal places.		
a 	______	1
b 	______	1
c 	______	1
d 	______	1
e 	______	1
3 The diagonal of a square is 12.5 cm long. 		
a What type of triangle is ΔBCD? ______	______	1
b What is the size of $\angle BDC$? ______	______	1
c Find the length of BC to the nearest mm. ______	______	1
d Find $\sin \angle BDC$ to three decimal places. ______	______	1
e Find $\tan \angle ABD$. ______	______	1

Total marks achieved for PART B $\frac{\quad}{15}$

© Pascal Press ISBN 978 1 74125 271 2

Chapter 11

Geometry

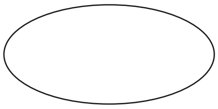
UNIT 1: Polygons

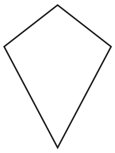
Question 1 Write the special name for the polygon with the following number of sides.

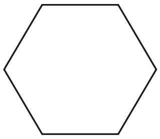
a 3 ______ **b** 4 ______ **c** 5 ______ **d** 6 ______

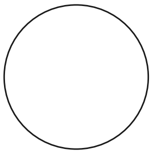
e 7 ______ **f** 8 ______ **g** 9 ______ **h** 10 ______

Question 2 State whether each of the following shapes is a polygon or not, and if it is, name it.

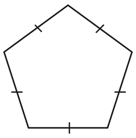
a

______

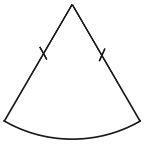
b

______

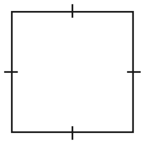
c

______

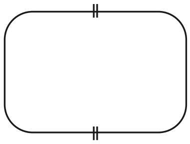
d

______

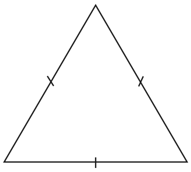
Question 3 State whether each of the following shapes is a polygon or not, and if it is, name it and state whether it is a regular or an irregular polygon.

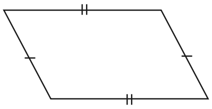
a

______

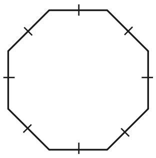
b

______

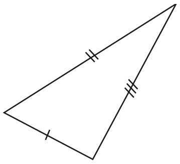
c

______

d

______

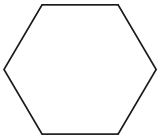
e

______

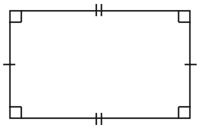
f

______

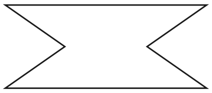
g

______

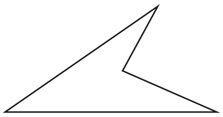
h

______

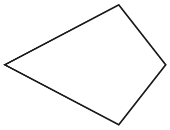
Question 4 Name each polygon and state whether it is a convex or a non-convex polygon.

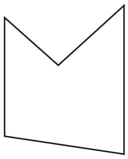
a

______

b

______

c

______

d

______

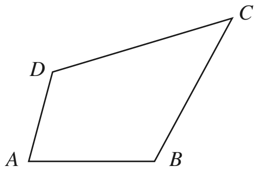
e

______

f

______

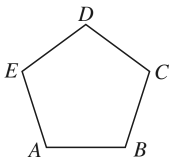
UNIT 2: The angle sum of a polygon

QUESTION 1 Divide each polygon into triangles by drawing all the diagonals from vertex A.

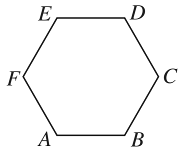
a



b



c



QUESTION 2 Complete the following table.

Name	Number of sides	Number of Δs formed	Angle sum of the interior angles
Triangle			
Quadrilateral			
Pentagon			
Hexagon			
Heptagon			
Octagon			
Nonagon			
Decagon			

QUESTION 3 Use the angle sum formula $S = (n - 2) \times 180°$ to find the sum of the interior angles of a polygon with:

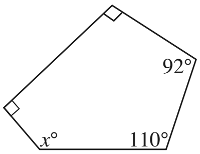
a 12 sides **b** 18 sides **c** 24 sides.

QUESTION 4 Find the number of sides of a polygon whose interior angle sum is:

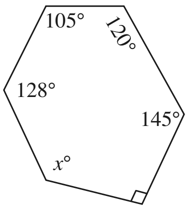
a 540° **b** 1080° **c** 1440°

QUESTION 5 Find the size of the unknown angle x in each polygon.

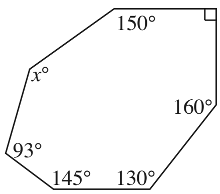
a



b



c

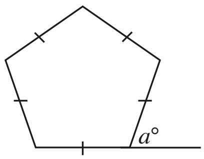


© Pascal Press ISBN 978 1 74125 271 2

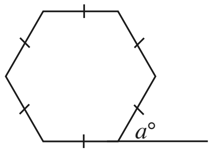
UNIT 3: Regular polygons

QUESTION 1 Calculate the size of each interior angle and each exterior angle in each polygon.

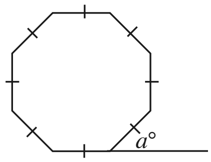
a



b



c



QUESTION 2 Find the size of each interior angle of a regular polygon.

a 10 sides

b 15 sides

c 20 sides

QUESTION 3 Find how many sides a regular polygon has if each interior angle is:

a 135°

b 144°

c 150°

QUESTION 4 Find the size of each interior angle of a regular

a hexagon

b nonagon

c dodecagon

QUESTION 5 The sum of the interior angles of a regular polygon is 3600°.

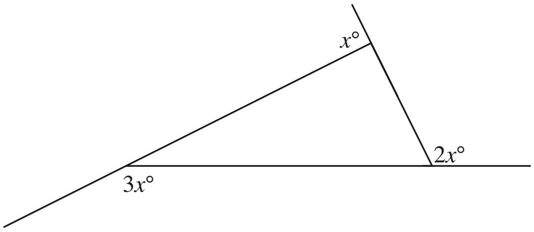
a Find the number of sides the polygon has.

b Find the size of each interior angle.

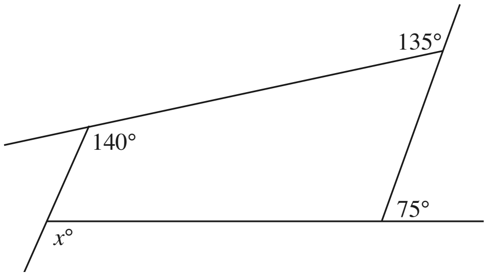
UNIT 4: The exterior angle sum of a polygon

QUESTION 1 Find the value of x.

a



b



QUESTION 2 Find the size of each exterior angle of a regular

a hexagon

b octagon

c decagon

QUESTION 3 If each exterior angle of a regular polygon is 72°, find:

a the number of sides of the polygon

b the size of each interior angle

c the sum of the interior angles.

QUESTION 4 For a regular polygon of 24 sides, find the following:

a the size of each exterior angle

b the size of each interior angle

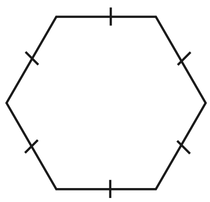
c the sum of the interior angles.

QUESTION 5 For a regular hexagon below, find the following:

a the size of each exterior angle

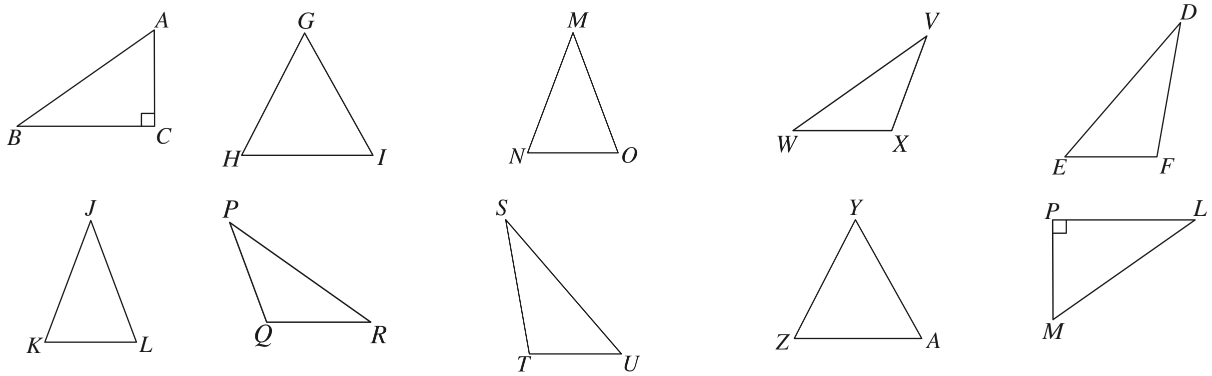
b the size of each interior angle

c the sum of the interior angles.



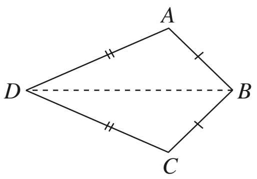
UNIT 5: Recognising congruent triangles

QUESTION 1 By measuring, find all pairs of congruent triangles.

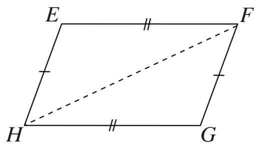


QUESTION 2 In the following pairs of congruent triangles:
i name all pairs of corresponding angles **ii** name all pairs of corresponding sides

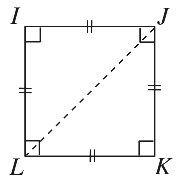
a



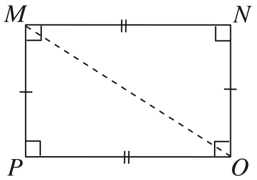
b



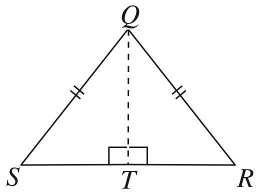
c



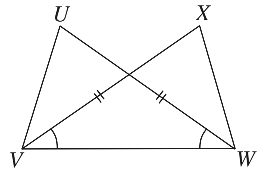
d



e

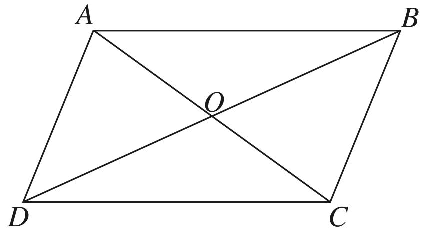


f

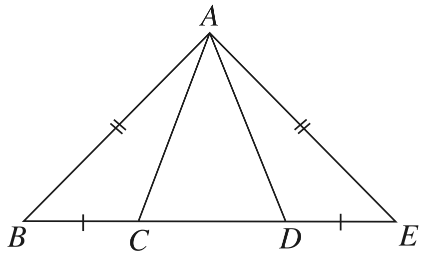


QUESTION 3 In the following shapes, name different pairs of congruent triangles.

a



b



Geometry

UNIT 6: Tests for congruent triangles

QUESTION 1 Complete the following statements.

a The symbol for congruence is ____________________.

b Two triangles are congruent if three sides of one triangle are equal to ______________________________ of the other triangle.

c Two triangles are congruent if two angles and a side of one triangle are equal to

______________________________ of the other triangle.

d Two triangles are congruent if two sides and the included angle of one triangle are equal to

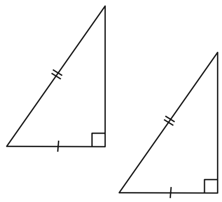
______________________________ of the other triangle.

e Two right-angled triangles are congruent if the hypotenuse and one side of one triangle are equal to

______________________________ of the other triangle.

QUESTION 2 In each pair of triangles, write the congruency test that would be used to prove that the triangles are congruent.

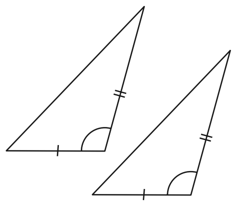
a



____

____

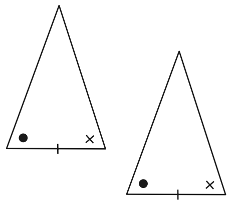
b



____

____

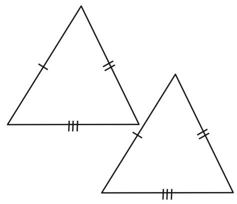
c



____

____

d



____

____

QUESTION 3 In the diagram, O is the centre of the circle. OC is drawn perpendicular to AB.

a Name the common side in ΔOAC and ΔOBC.

____

b Name the pair of sides that are equal.

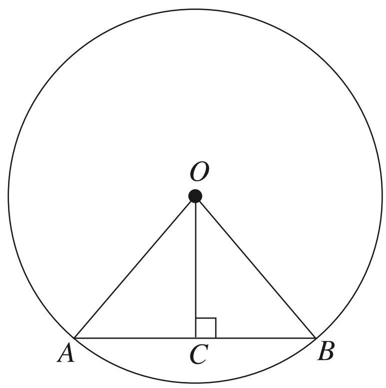
____

c Are the triangles congruent?

____

d If they are congruent, name the test you can use to prove it.

____



Geometry

TOPIC TEST — PART A

Time allowed: 15 minutes — **Total marks: 15**

Marks

1 The angle sum of a triangle is always equal to — 1

(A) 90° (B) 180° (C) 270° (D) 360°

2 What name is given to a polygon with 7 sides? — 1

(A) hexagon (B) heptagon (C) nonagon (D) noptagon

3 How many sides does a dodecagon have? — 1

(A) 9 (B) 10 (C) 11 (D) 12

4 Which is NOT a test for congruent triangles? — 1

(A) AAA (B) AAS (C) SAS (D) SSS

5 What is the angle sum of an octagon? — 1

(A) 1080° (B) 1260° (C) 1350° (D) 1440°

6 The angle sum of a quadrilateral is always equal to — 1

(A) 90° (B) 180° (C) 270° (D) 360°

7 The number of sides in a quadrilateral is — 1

(A) 2 (B) 3 (C) 4 (D) 5

8 The exterior angles of a regular pentagon are each — 1

(A) 36° (B) 54° (C) 72° (D) 108°

9 The minimum number of sides in a polygon is — 1

(A) 2 (B) 3 (C) 4 (D) 5

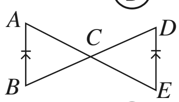
10 The sum of the exterior angles of any polygon is equal to — 1

(A) 90° (B) 180° (C) 270° (D) 360°

11 If a triangle has all three sides equal, find the size of each angle. — 1

(A) 30° (B) 45° (C) 60° (D) 90°

12 Referring to the diagram, what correctly completes this sentence:
$\Delta ABC = \Delta$ ___________



(A) ΔDEC (B) ΔDCE (C) ΔECD (D) ΔEDC — 1

13 If all the sides and angles of a polygon are equal, it is what type of polygon — 1

(A) open (B) closed (C) regular (D) irregular

14 If all the interior angles of a polygon are less than 180°, the polygon is called — 1

(A) open (B) closed (C) convex (D) concave

15 A three-sided regular polygon is what type of triangle? — 1

(A) right-angled (B) scalene (C) isosceles (D) equilateral

Total marks achieved for PART A — /15

Geometry

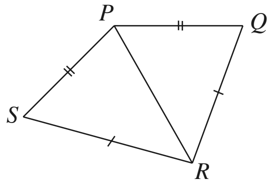
TOPIC TEST — PART B

Instructions
- This part consists of 15 questions.
- Each question is worth 1 mark.
- Write only the answer in the answer column.
- For any working use the question column.

Time allowed: 20 minutes **Total marks: 15**

Questions | **Answers** | **Marks**

1 In the quadrilateral $PS = PQ$ and $SR = QR$.



a Complete $\Delta PSR \equiv \Delta$________ ______ 1

b Which test is used to show the triangles congruent? ______ 1

2 Draw a regular hexagon $ABCDEF$ and from vertex (A) draw all the diagonals.

a How many diagonals are drawn? ______ 1

b How many triangles are formed? ______ 1

c What is the sum of the interior angles of a hexagon? ______ 1

d Find the size of each interior angle. ______ ______ 1

e Find the size of each exterior angle. ______ ______ 1

3 For a regular polygon with 20 sides,

a are all the angles equal? ______ 1

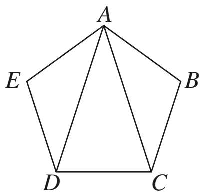
b what is the sum of the exterior angles of this polygon? ______ 1

c find the size of each exterior angle. ______ ______ 1

d find the size of each interior angle. ______ ______ 1

e find the sum of the interior angles of the polygon. ______ ______ 1

4 $ABCDE$ is a regular pentagon.



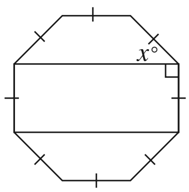
a Which test is used to show $\Delta AED \equiv \Delta ABC$? ______ 1

b What is the size of $\angle ADC$?

______

______ ______ 1

5 Find the value of x.



______

______

______ ______ 1

Total marks achieved for PART B ___ / 15

Answers

Chapter 7 – Coordinate geometry

Page 58 **1 a** 4 units **b** 5 units **c** 5 units **d** 4 units **e** 4 units **f** 3 units **g** 7 units **h** 5 units **2 a** $\sqrt{52}$ units **b** $\sqrt{41}$ units **c** $\sqrt{65}$ units **3 a** 10 units **b** $\sqrt{41}$ units **c** $\sqrt{117}$ units **4 a** (–3, 4) **b i** 5 units **ii** 6 units **iii** 5 units **iv** 6 units **v** $\sqrt{61}$ units **vi** $\sqrt{61}$ units **c** 22 units **d** 30 units^2

Page 59 **1 a** $\sqrt{32}$ units **b** $\sqrt{50}$ units **c** $\sqrt{50}$ units **d** $\sqrt{10}$ units **e** $\sqrt{13}$ units **f** $\sqrt{10}$ units **2 a** 11.7 units **b** 6.4 units **c** 10.8 units **d** 10.0 units **e** 4.5 units **f** 1.4 units **3 a** 41 **b** $(15+\sqrt{45})$ units **4 a** 7 units **b** 4 units **c** 7 units **d** 4 units **e** $\sqrt{65}$ units **f** $\sqrt{65}$ units

Page 60 **1 a** 8 **b** 8 **c** 8 **d** 5 **e** 5 **f** 5 **2 a** 3 **b** 1 **c** 5 **d** 3 **3 a** 8 **b** 8 **c** 6 **d** 9 **e** 7 **f** 3 **g** 2 **h** 0 **i** 10 **j** 5 **k** 10 **l** 10 **4 a** 5 **b** 4 **c** (5, 4) **5 a** 12 **b** 3 **c** 9 **d** 7 **e** 5 **f** 4 **g** 2 **h** 2 **i** 1 **j** 7 **k** –4 **l** –5

Page 61 **1 a** (0, 8) **b** (5, 8) **c** $(-4\frac{1}{2}, 2)$ **d** (6, 6) **e** (7, 4) **f** (2, 6) **2 a** (5, 0) **b** (8, 4) **c** (8, 12) **d** (5, 7) **e** (–1, –1) **f** (2, 2) **3 a** (3, 2) **b** (3, 2) **c** yes **d** bisect each other **4 a** $(3\frac{1}{2}, 7\frac{1}{2})$ **b** (5, 1) **c** (6, 10) **d** (6, 8) **e** (–3, –3) **f** (1, 1) **5** (8, 14), $(5\frac{1}{2}, 10)$, $(-\frac{1}{2}, 9)$ **6** (5 – 5) = 0; (–8 + 8) = 0; so (0, 0)

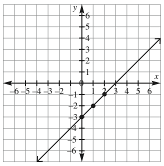
Page 62 **1 a** (2, 5) **b** (–3, 6) **2 a** (7, 8) **b** (9, 11) **c** (8, –7) **d** (–4, 6) **e** (9, 11) **f** (8, 6) **g** (7, 13) **h** (10, 13) **i** (–1, 7) **j** (8, 16) **k** (11, 6) **l** (9, –3) **3 a** (4, 7) **b** (4, 8) **c** (2, 0) **d** (2, 6) **e** (4, 6) **f** (8, 12) **g** (2, 13) **h** (1, 2) **4 a** (6, 10) **b** (3, –5) **c** $p = 10$ **d** $x = -7$, $y = 7$

Page 63 **1 a** negative **b** positive **c** positive **d** negative **2 a** $-\frac{3}{4}$ **b** $\frac{3}{5}$ **c** $\frac{5}{6}$ **d** 2 **e** $\frac{5}{4}$ **f** $-\frac{4}{3}$ **g** $\frac{5}{7}$ **h** 1 **i** $-\frac{1}{2}$

Page 64 **1 a** $-\frac{3}{2}$ **b** 1 **c** –1 **d** 1 **e** 3 **f** $\frac{8}{5}$ **2 a** 1 **b** –1 **c** 1 **d** $\frac{10}{3}$ **e** $-\frac{1}{3}$ **f** $\frac{9}{5}$ **3** the gradient (2) is the same for the three lines **4** $x = 5$ **5** *AB* and *CD* have the same gradient of $-\frac{5}{3}$; *BC* and *AD* have the same gradient of $\frac{2}{5}$ **6** (0, 1), (–1, –1) and (2, 5)

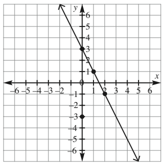
Page 65 **1 a** 4 **b** 2 **c** positive **d** right **2 a** 0 **b** 1 **c** positive **d** right **3 a** –2 **b** $\frac{1}{3}$ **c** positive **d** right **4 a** 6 **b** $-\frac{3}{2}$ **c** negative **d** left **5 a** 0 **b** –1 **c** negative **d** left **6 a** –2 **b** $-\frac{2}{3}$ **c** negative **d** left

Page 66 **1 a** –3, –2, –1 **b**



c 1 **d** positive **e** right **f** 1 **g** yes **h** –3 **i** yes

2 a 3, 1, –1 **b**



c –2 **d** negative **e** left **f** –2 **g** yes **h** 3 **i** yes
3 a i 8 **ii** –5 **b i** 2 **ii** 3 **c i** –3 **ii** 7

Page 67 **1 a** $3x + 5y - 9 = 0$ **b** $2x - y - 7 = 0$ **c** $3x - y - 4 = 0$ **d** $4x - 3y - 8 = 0$ **e** $9x - y - 7 = 0$ **f** $2x + y + 6 = 0$ **g** $9x - 7y - 5 = 0$ **h** $4x - 13y + 18 = 0$ **i** $x - 5y + 10 = 0$ **2 a** $y = 6x - 10$ **b** $y = 2x + 8$ **c** $y = -\frac{2}{3}x + \frac{1}{3}$ **d** $y = \frac{1}{2}x + 2$ **e** $y = -5x$ **f** $y = \frac{9}{4}x - 3$ **g** $y = -x + 2$ **h** $y = \frac{3}{2}x - \frac{7}{2}$ **i** $y = \frac{3}{4}x - 2$ **3 a** $m = 3, b = 1$ **b** $m = 9, b = -5$ **c** $m = -1, b = -3$ **d** $m = -4, b = 7$ **e** $m = \frac{2}{3}, b = -5$ **f** $m = \frac{1}{4}, b = -2$ **4 a** $y = 3x + 2$ **b** $y = 9x - 3$ **c** $y = -x + 7$ **d** $y = \frac{3}{4}x + 5$ **e** $y = -\frac{2}{3}x + 1$ **f** $y = -7x + 8$ **5 a** $y = 4x + 14$ **b** $y = 2x - 9$ **c** $y = \frac{1}{2}x + \frac{9}{2}$ **d** $y = \frac{2}{3}x + \frac{22}{3}$ **e** $y = -\frac{1}{3}x + \frac{17}{3}$ **f** $y = -3x + 8$

Page 68 **1 b** yes **2 a** yes **b** yes **c** yes **d** no **e** yes **f** no **3 a** no **b** yes **c** yes **d** no **e** yes **f** no **4 a** (0, –5) **b** (2, –1) **c** (3, 1) **d** (–2, –9) **e** (1, –3) **f** (5, 5) **5 a** $p = 3$ **b** $m = 1$

Page 69 **1** C **2** C **3** C **4** C **5** C **6** D **7** C **8** B **9** A **10** C **11** B **12** D **13** C **14** D **15** B

Page 70 **1 a** $\sqrt{26}$ units **b** $(\frac{1}{2}, 5\frac{1}{2})$ **c** $-\frac{1}{5}$ **d** $x + 5y - 28 = 0$ **e** $y = -\frac{1}{5}x + \frac{28}{5}$ **2 a** 10 units **b** 32 **c** $\sqrt{80}$ units **d** (0, 0) **e** (5, 7) **3 a** yes **b** (2, 5) **c** (6, –16) **d** (2, 2) **e** $y = -\frac{2}{3}x + 6$

Chapter 8 – Linear and non-linear relationships

Page 71

1 a $y = 2x + 1$ **b** $y = 3x + 2$ **c** $y = 2x - 3$ **d** $y = 5x - 4$ **e** $y = 4x + 1$ **f** $y = 3x - 8$

 ISBN 978 1 74125 271 2

Answers

x	y
0	1
1	3
2	5
3	7

x	y
–2	–4
–1	–1
0	2
1	5

x	y
–3	–9
0	–3
3	3
4	5

x	y
–1	–9
0	–4
4	16
5	21

x	y
–3	–11
–1	–3
1	5
3	13

x	y
–6	–26
–4	–20
0	–8
2	–2

2 **a** $m = 2n - 5$

n	m
–1	–7
0	–5
1	–3
2	–1

b $a = 3b + 7$

b	a
1	10
2	13
3	16
4	19

c $p = 2q + 10$

q	p
–1	8
0	10
1	12
2	14

d $s = 3t + 1$

t	s
–1	–2
0	1
1	4
2	7

e $y = 4x - 7$

x	y
–2	–15
–1	–11
0	–7
1	–3

f $2x + y = 3$

x	y
–2	7
–1	5
0	3
1	1

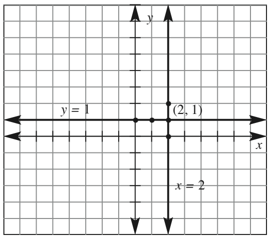
Page 72

1 **a** $x = 2$

x	2	2	2
y	0	1	2

$y = 1$

x	0	1	2
y	1	1	1



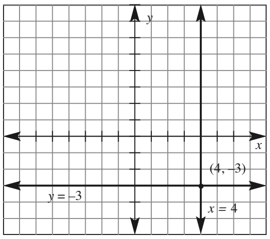
Point of intersection (2, 1)

b $x = 4$

x	4	4	4
y	0	1	2

$y = -3$

x	0	1	2
y	–3	–3	–3



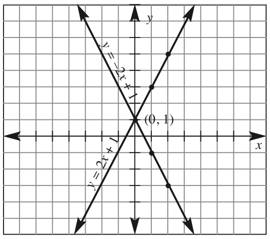
Point of intersection (4, –3)

2 **a** $y = 2x + 1$

x	0	1	2
y	1	3	5

$y = -2x + 1$

x	0	1	2
y	1	–1	–3



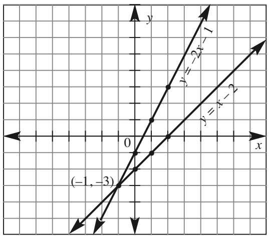
Point of intersection (0, 1)

b $y = 2x - 1$

x	0	1	2
y	–1	1	3

$y = x - 2$

x	0	1	2
y	–2	–1	0



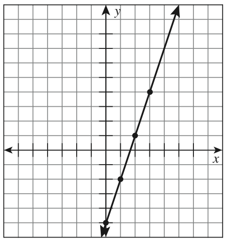
Point of intersection (–1, –3)

Page 73 **1** **a** 5 **b** the fixed amount of pocket money per week, \$5 **c** 5 **d** The rate that Andrew's mother pays him per hour when he helps. **2** **a** 90 **b** Clair is 90 km from Baxton **c** –15 **d** Melissa rides at a constant speed of 15 km/h **e** $d = -15t + 90$

Page 74 **1** **a** $2x - 5y - 9 = 0$ **b** $3x + 4y - 8 = 0$ **c** $5x - 2y - 7 = 0$ **d** $4x - 8y + 3 = 0$ **e** $2x + y - 9 = 0$ **f** $8x - y + 7 = 0$ **g** $2x - 3y + 6 = 0$ **h** $8x - 9y + 12 = 0$ **i** $x - 6y + 3 = 0$ **2** **a** $y = -\frac{2}{3}x + \frac{8}{3}$; $m = -\frac{2}{3}$, $b = \frac{8}{3}$ **b** $y = -\frac{1}{5}x + \frac{7}{5}$; $m = -\frac{1}{5}$, $b = \frac{7}{5}$ **c** $y = \frac{3}{2}x - \frac{3}{2}$; $m = \frac{3}{2}$, $b = -\frac{3}{2}$ **d** $y = x + 7$; $m = 1$, $b = 7$ **e** $y = -2x + 9$; $m = -2$, $b = 9$ **f** $y = \frac{5}{6}x + \frac{11}{6}$; $m = \frac{5}{6}$, $b = \frac{11}{6}$ **g** $y = \frac{3}{2}x - 3$; $m = \frac{3}{2}$, $b = -3$ **h** $y = -\frac{4x}{5} - \frac{3}{5}$; $m = -\frac{4}{5}$, $b = -\frac{3}{5}$ **i** $y = 2x + 6$; $m = 2$, $b = 6$ **3** **a** $y = 4x + 3$; $4x - y + 3 = 0$ **b** $y = 2x - 5$; $2x - y - 5 = 0$ **c** $y = 3x + 7$; $3x - y + 7 = 0$ **d** $y = \frac{1}{2}x + 4$; $x - 2y + 8 = 0$ **e** $y = \frac{2}{3}x + 6$; $2x - 3y + 18 = 0$ **f** $y = -\frac{5}{6}x + 3$; $5x + 6y - 18 = 0$

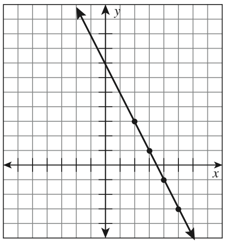
Page 75 **1** **a** **i** 5 **ii** 3 **iii** –2 **b** **i** 4 **ii** –5 **iii** –2 **c** **i** $x = 4$ **ii** $x = -5$ **iii** $x = -2$ **2** **a** $x = 1$ **b** $x = 2$ **c** $x = -1$ **d** $x = -2$ **e** $x = 3$ **f** $x = \frac{1}{2}$ **g** $x = \frac{3}{2}$ **h** $x = \frac{5}{2}$ **i** $x = -\frac{1}{2}$

Page 76 **1** **a** –5, –2, 1, 4 **b**



c **i** $x = 2$ **ii** $x = 4$ **iii** $x = 1$ **iv** $x = -1$

2 **a** 9, 7, 5, 3, 1 **b**



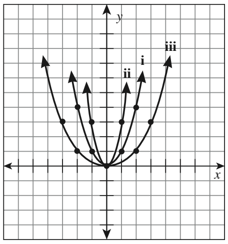
c **i** $x = 3$ **ii** $x = 2$ **iii** $x = 1$ **iv** $x = 4$ **v** $x = 5$

Answers

Page 77

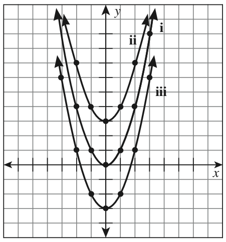
1

	x	–3	–2	–1	0	1	2	3
i	$y = x^2$	9	4	1	0	1	4	9
ii	$y = 3x^2$	27	12	3	0	3	12	27
iii	$y = \frac{5}{6}x^2$	3	$\frac{4}{3}$	$\frac{1}{3}$	0	$\frac{1}{3}$	$\frac{4}{3}$	3



2

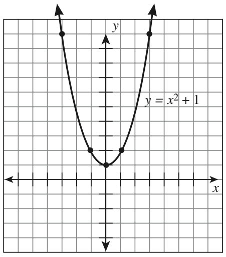
		–3	–2	–1	0	1	2	3
i	$y = x^2$	9	4	1	0	1	4	9
ii	$y = x^2 + 3$	12	7	4	3	4	7	12
iii	$y = x^2 - 3$	6	1	–2	–3	–2	1	6



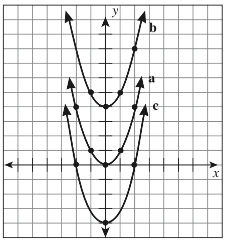
3

x	–3	–2	–1	0	1	2	3
$y = x^2 + 1$	10	5	2	1	2	5	10

a $x = 0$ **b** (0, 1) **c** $y = 1$ **d** no x-intercepts **e** $y = 1$



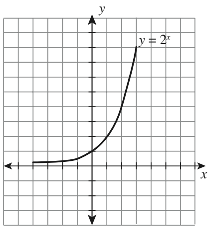
4



d The graph $y = x^2$ can be moved up and down the vertical axis by adding a constant C (–4 or + 4)

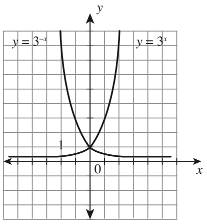
Page 78 **1** **a** $y = x^2$ **b** $y = x^2 + 1$ **c** $y = 2x^2$ **d** $y = -x^2$ **e** $y = x^2 - 4$ **f** $y = 1 - x^2$ **g** $y = \frac{1}{2}x^2$ **h** $y = 2x^2 + 3$ **2** **a** 64 m **b** 48 m **c** 84 m **d** 100 m **e** 10 s **f** 1.6 s and 18.4 s **g** 20 s

Page 79 **1** **a** $\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1, 2, 4, 8$ **b**



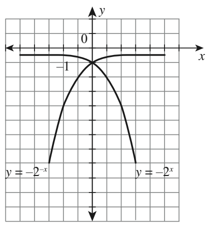
c becomes very large **d** gets closer and closer to 0 **e** 1

2 **a** $\frac{1}{9}, \frac{1}{3}, 1, 3, 9$ **b and d**

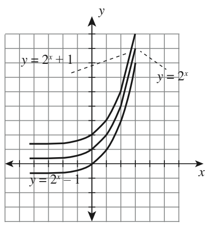


c $9, 3, 1, \frac{1}{3}, \frac{1}{9}$ **e** $x = 0$ **3** $(y = -2^x)$ $-\frac{1}{8}, -\frac{1}{4}, -\frac{1}{2}, -1, -2, -4, -8$;

$(y = -2^{-x})$ $-8, -4, -2, -1, -\frac{1}{2}, -\frac{1}{4}, -\frac{1}{8}$;



4 $(y = 2^x)$ $\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1, 2, 4, 8$; $(y = 2^x + 1)$ $1\frac{1}{8}, 1\frac{1}{4}, 1\frac{1}{2}, 2, 3, 5, 9$; $(y = 2^x - 1)$ $-\frac{7}{8}, -\frac{3}{4}, -\frac{1}{2}, 0, 1, 3, 7$;

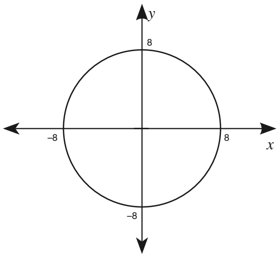


Page 80 **1** **a** (0, 0) **b** 5 **c** $x^2 + y^2 = 25$ **d** $4^2 + 3^2 = 25$ **2** **a** 10 **b** $x^2 + y^2 = 100$ **3** **a** $x^2 + y^2 = 36$ **b** $x^2 + y^2 = 9$ **c** $x^2 + y^2 = 16$

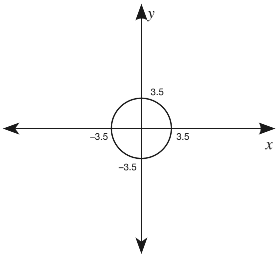
Answers

d $x^2 + y^2 = 81$ **4 a** (0, 0), 2 **b** (0, 0), 7 **c** (0, 0), 12 **d** (0, 0), 2.5

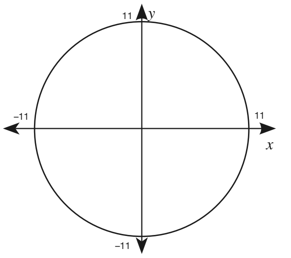
5 a



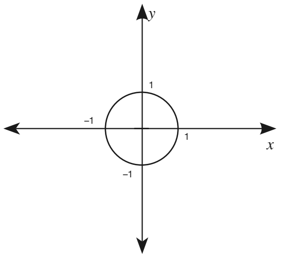
b



c



d



Page 81 **1** C **2** B **3** B **4** C **5** A **6** B **7** C **8** D **9** D **10** B **11** C **12** A

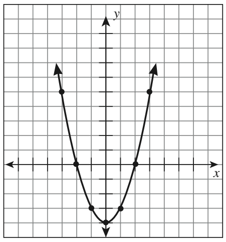
Page 82 **1 a** (0, 0) **b** 10 units **c** $x^2 + y^2 = 100$ **d** 98 **e** inside **2 a** 2 **b** –4 **c** $y = 2x - 4$ **d** $x = 2$ **e** $x = 6$

3 a

x	–3	–2	–1	0	1	2	3
$y = x^2 - 4$	5	0	–3	–4	–3	0	5

c $x = 0$ **d** (0, –4) **e** (–2, 0) and (2, 0)

b



Chapter 9 – Equations

Page 83 **1 a** $x = 7$ **b** $a = 11$ **c** $n = 10$ **d** $y = 4$ **e** $n = 2$ **f** $k = 17$ **g** $a = 12$ **h** $t = 3$ **i** $x = 14$ **j** $m = 9$ **k** $p = 3$ **l** $y = 6$ **2 a** $a = 16$ **b** $x = 28$ **c** $m = 28$ **d** $n = 11$ **e** $a = 28$ **f** $a = 7$ **g** $y = 3$ **h** $t = 1$ **i** $y = -3$ **j** $x = 28$ **k** $p = 16$ **l** $m = -10$ **3 a** $a = 16$ **b** $x = 14$ **c** $b = 5$ **d** $k = 10$ **e** $n = 4$ **f** $a = 26$ **g** $m = 34$ **h** $t = 34$ **i** $y = 26$ **j** $x = 27$ **k** $a = 27$ **l** $x = 37$ **4 a** $x = 15$ **b** $n = 5$ **c** $m = 17$ **d** $y = 12$ **e** $x = 13$ **f** $y = 16$ **g** $m = 14$ **h** $t = 8$ **i** $a = 4$

Page 84 **1 a** $x = 3$ **b** $y = 6$ **c** $t = 3$ **d** $m = 18$ **e** $n = 16$ **f** $a = 20$ **g** $x = 5$ **h** $y = 10$ **i** $x = 12$ **j** $x = 28$ **k** $x = 22$ **l** $t = -6$ **2 a** $a = 8$ **b** $a = 18$ **c** $x = 40$ **d** $x = 8$ **e** $m = 7$ **f** $t = 14$ **g** $y = 32$ **h** $x = -21$ **i** $x = 3$ **j** $d = -9$ **k** $x = 11$ **l** $t = 5$ **3 a** $x = 6$ **b** $y = -14$ **c** $m = -8$ **d** $m = -9$ **e** $t = 4$ **f** $n = 7$ **g** $a = 11$ **h** $p = 48$ **i** $x = 14$ **j** $n = -70$ **k** $x = -24$ **l** $y = -56$ **4 a** $x = 54$ **b** $x = 5$ **c** $x = -12$ **d** $x = -2$ **e** $y = -5$ **f** $m = 27$ **g** $y = 32$ **h** $a = -63$ **i** $x = 11\frac{1}{2}$ **j** $y = 5$ **k** $x = 7\frac{1}{2}$ **l** $m = -33$

Page 85 **1 a** $x = 2$ **b** $x = 5$ **c** $y = 3$ **d** $a = 5$ **e** $a = 5$ **f** $m = 4$ **g** $x = 23$ **h** $a = 20$ **i** $x = 7$ **2 a** $x = 8$ **b** $y = 3$ **c** $p = 3$ **d** $a = 33$ **e** $a = 3$ **f** $a = \frac{1}{2}$ **g** $x = 7$ **h** $x = 10$ **i** $x = 19$ **3 a** $y = 15$ **b** $y = 1$ **c** $x = 4$ **d** $t = 2$ **e** $m = 39$ **f** $x = 9$ **g** $y = 1$ **h** $y = 6$ **i** $x = 8$ **j** $x = 40$ **k** $y = -5$ **l** $p = -1$

Page 86 **1 a** $a = 10$ **b** $x = -7$ **c** $x = -10$ **d** $a = \frac{2}{3}$ **e** $t = -15$ **f** $a = -1$ **g** $y = 4$ **h** $a = -4$ **i** $t = -1$ **2 a** $m = \frac{2}{3}$ **b** $x = 15$ **c** $a = \frac{14}{3}$ **d** $x = 4$ **e** $a = 1$ **f** $x = -2$ **g** $x = 3$ **h** $m = 15$ **i** $x = -26$ **3 a** $x = -2$ **b** $a = 26$ **c** $x = -1$ **d** $x = 6$ **e** $y = -5$ **f** $y = 8$ **g** $y = 1$ **h** $y = 15$ **i** $t = -45$ **j** $t = 0$ **k** $x = -\frac{7}{13}$ **l** $y = -5$ **m** $a = 10$ **n** $x = -3$ **o** $x = 12$

Page 87 **1 a** $x = 3$ **b** $y = 4$ **c** $m = 6$ **d** $x = 3$ **e** $x = 4\frac{1}{2}$ **f** $x = 3$ **g** $x = 5$ **h** $x = -3$ **i** $y = -6$ **2 a** $x = 4\frac{1}{2}$ **b** $m = 11$ **c** $t = 3$ **d** $p = -3$ **e** $x = 1$ **f** $a = -32$ **g** $x = 3$ **h** $a = 14$ **i** $x = 43$ **3 a** $m = -4\frac{2}{7}$ **b** $x = 18$ **c** $-\frac{1}{9}$ **d** $a = 13$ **e** $m = -13$ **f** $t = 1\frac{1}{2}$ **g** $a = 3$ **h** $n = -19$ **i** $a = 2\frac{1}{2}$ **j** $x = 4$ **k** $y = 31$ **l** $a = -28$

Page 88 **1** B **2** D **3** D **4** B **5** C **6** B **7** B **8** C **9** C **10** A **11** B **12** C **13** A **14** B **15** C

Page 89 **1 a** $x = 35$ **b** $x = 7$ **c** $y = -72$ **d** $m = 48$ **e** $x = \sqrt[\pm]{3}$ **f** $x = -\frac{1}{3}$ **g** $p = 15$ **h** $x = -\frac{1}{8}$ **i** $x = -9$ **j** $x = 29$ **k** $x = -2\frac{2}{9}$ **l** $m = 15$ **2** $x = 10$ **3 a** $S = 2460$ **b** $n = 17$

Chapter 10 – Trigonometry

Page 90 **1 a** x = opp, y = adj, z = hyp **b** x = hyp, y = adj, z = opp **c** x = adj, y = hyp, z = opp **2 a** a = opp, b = adj, c = hyp **b** d = opp, e = adj, f = hyp **c** g = opp, i = adj, h = hyp **d** k = opp, l = adj, j = hyp **e** n = opp, m = adj, o = hyp **f** r = opp, q = adj, p = hyp **3 a** *AB* **b** *DF* **c** *GI* **d** *JK* **e** *MN* **f** *PQ*

Page 91 **1 a** sin **b** cos **c** tan **2 a** $\frac{40}{41}$ **b** $\frac{5}{13}$ **c** $\frac{8}{17}$ **3 a** $\frac{4}{5}$ **b** $\frac{15}{17}$ **c** $\frac{3}{\sqrt{58}}$ **4 a** $\frac{1}{3}$ **b** $\frac{5}{2}$ **c** $\frac{5}{12}$ **5 a** $\frac{12}{37}$ **b** $\frac{12}{37}$ **c** $\frac{35}{12}$ **d** $\frac{35}{37}$ **e** $\frac{35}{37}$ **f** $\frac{12}{35}$ **6 a** $\frac{a}{b}$ **b** $\frac{b}{c}$ **c** $\frac{b}{c}$ **d** $\frac{a}{c}$ **e** $\frac{b}{a}$ **f** $\frac{a}{c}$

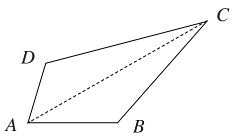
Page 92 **1 a** sin *A*, sin *B* **b** sin *D*, sin *E* **c** sin *P*, sin *Q* **2 a** cos *B*, cos *A* **b** cos *D*, cos *E* **c** cos *P*, cos *Q* **3 a** tan *A*, tan *B* **b** tan *D*, tan *E* **c** tan *P*, tan *Q* **4 a** sin **b** cos **c** tan **d** tan **e** cos **f** sin **g** tan **h** sin **i** cos

Page 93 **1 a** 0.56 **b** 2.75 **c** 0.97 **d** 0.52 **e** 0.77 **f** 0.62 **g** 8.14 **h** 0.50 **i** 2.05 **2 a** 0.287 **b** 0.055 **c** 23.073 **d** 0.312 **e** 0.059 **f** 25.519 **g** 0.077 **h** 0.356 **i** 1542.844 **3 a** 1.66 **b** 1.49 **c** 0.814 **d** 4.02 **e** 0.428 **f** 0.935 **g** 0.475 **h** 3.50 **i** 0.440 **4 a** 39° **b** 68°

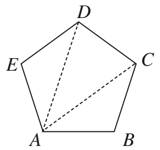
c 68° **d** 55° **e** 38° **f** 50° **g** 59° **h** 16° **i** 10° **5 a** 30° **b** 30° **c** 50° **d** 67° **e** 60° **f** 65° **6 a** 35° **b** 67° **c** 35° **d** 30° **e** 42° **f** 40°
Page 94 **1 a** 3.5 **b** 3.9 **c** 4.4 **2 a** 16.1 **b** 27.0 **c** 24.9 **3 a** 9.9 **b** 5.6 **c** 12.6 **4 a** 8.86 **b** 24.93 **c** 11.08
Page 95 **1 a** $x = 4.2$ **b** $a = 4.9$ **c** $p = 5.3$ **2 a** $n = 7.56$ **b** $m = 9.77$ **c** $p = 10.64$ **3 a** $q = 3.35$ **b** $t = 9.18$ **c** $l = 7.49$ **d** $c = 5.58$ **e** $d = 23.90$ **f** $k = 5.45$
Page 96 **1 a** 16.6 cm **b** 15.6 cm **c** 16.7 cm **2 a** 16.00 cm **b** 14.15 cm **c** 19.30 cm **3 a** 31.4 cm **b** 34.7 cm **c** 24.4 cm **d** 20.2 cm **e** 12.0 cm **f** 19.5 cm
Page 97 **1 a** sin **b** tan **c** cos **d** sin **2 a** 2.5 m **b** 4.7 m **c** 8.8 m **d** 11.1 m **e** 3.3 m **f** 2.8 m **3 a** 2.97 **b** 8.06 **c** 49.10
Page 98 **1 a** $\theta = 31°$ **b** $\alpha = 57°$ **c** $\beta = 76°$ **2 a** $\beta = 68°$ **b** $\theta = 24°$ **c** $\alpha = 37°$ **3 a** $\beta = 71°$ **b** $\alpha = 35°$ **c** $\theta = 60°$ **d** $\theta = 74°$ **e** $\alpha = 69°$ **f** $\beta = 23°$ **4 a** 45°34' **b** 61°56' **c** 48°35'
Page 99 **1** 1.94 m **2** $x = 24$ cm **3** $\angle P = 51°$ **4** 5.75 cm **5** $\angle ACD = 25°$ **6** 43 m
Page 100 **1** C **2** B **3** B **4** B **5** B **6** C **7** B **8** C **9** A **10** B **11** C **12** B **13** B **14** B **15** C
Page 101 **1 a i** 0.03 **ii** 29.31 **iii** 41.25 **b i** 43° **ii** 56° **2 a** $x = 8.06$ cm **b** $m = 14.38$ cm **c** $y = 9.73$ cm **d** $h = 20.71$ cm **e** $c = 15.34$ cm **3 a** right-angled isosceles **b** 45° **c** 8.8 cm **d** 0.707 **e** 1

Chapter 11 – Geometry

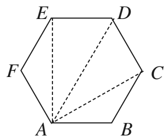
Page 102 **1 a** triangle **b** quadrilateral **c** pentagon **d** hexagon **e** heptagon **f** octagon **g** nonagon **h** decagon **2 a** no **b** yes, kite **c** yes, hexagon **d** no **3 a** pentagon, regular **b** no **c** square, regular **d** no **e** equilateral triangle, regular **f** parallelogram, irregular **g** octagon, regular **h** scalene triangle, irregular **4 a** hexagon, convex **b** rectangle, convex **c** hexagon, non-convex **d** quadrilateral, non-convex **e** kite, convex **f** pentagon, non-convex
Page 103 **1 a**



b



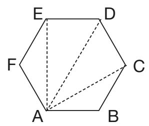
c



2

Name	Number of sides	Number of ∆s formed	Angle sum of the interior angles
Triangle	3	1	180°
Quadrilateral	4	2	360°
Pentagon	5	3	540°
Hexagon	6	4	720°
Heptagon	7	5	900°
Octagon	8	6	1080°
Nonagon	9	7	1260°
Decagon	10	8	1440°

3 a 1800° **b** 2880° **c** 3960° **4 a** 5 **b** 8 **c** 10 **5 a** $x = 158$ **b** $x = 132$ **c** $x = 132$
Page 104 **1 a** 108°, $a = 72$ **b** 120°, $a = 60$ **c** 135°, $a = 45$ **2 a** 144° **b** 156° **c** 162° **3 a** 8 sides **b** 10 sides **c** 12 sides **4 a** 120° **b** 140° **c** 150° **5 a** 22 **e** 163.6°
Page 105 **1 a** 60° **b** 110° **2 a** 60° **b** 45° **c** 36° **3 a** 5 sides **b** 108° **c** 540° **4 a** 15° **b** 165° **c** 3960° **5 a** 60° **b** 120° **c** 720°
Page 106 **1** ΔABC and ΔMLP; ΔGHI and ΔYZA; ΔMNO and ΔJKL; ΔVWX and ΔPRQ; ΔDEF and ΔSUT **2 a i** $\angle A$ and $\angle C$; $\angle ADB$ and $\angle CDB$; $\angle ABD$ and $\angle CBD$ **ii** $AD = CD$; $AB = CB$; $BD = BD$ **b i** $\angle E = \angle G$, $\angle EHF = \angle GFH$, $\angle EFH = \angle GHF$ **ii** $EH = FG$, $EF = HG$, $HF = HF$ **c i** $\angle I = \angle K$, $\angle ILJ = \angle KJL$, $\angle IJL = \angle KLJ$ **ii** $IJ = KL$, $IL = KJ$, $LJ = JL$
d i $\angle P = \angle N$, $\angle PMO = \angle NOM$, $\angle POM = \angle NMO$ **ii** $MN = OP$, $MP = ON$, $MO = OM$
e i $\angle QTS = \angle QTR$, $\angle S = \angle R$, $\angle SQT = \angle RQT$ **ii** $QS = QR$, $QT = QT$, $ST = RT$
f i $\angle U = \angle X$, $\angle UWV = \angle XVW$, $\angle UVW = \angle XWV$ **ii** $UV = XW$, $VW = WV$, $UW = XV$
3 a $\Delta AOD \equiv \Delta COB$; $\Delta AOB \equiv \Delta COD$; $\Delta ADC \equiv \Delta CBA$; $\Delta ABD \equiv \Delta CDB$ **b** $\Delta ABC \equiv \Delta AED$ and $\Delta ABD \equiv \Delta AEC$
Page 107 **1 a** $\equiv$ **b** three sides **c** two angles and a side **d** two sides and the included angle **e** the hypotenuse and one side **2 a** RHS **b** SAS **c** AAS **d** SSS **3 a** OC **b** $OA = OB$ **c** yes **d** RHS
Page 108 **1** B **2** B **3** D **4** A **5** A **6** D **7** C **8** C **9** B **10** D **11** C **12** D **13** C **14** C **15** D
Page 109 **1 a** PQR **b** SSS **2**



a 3 **b** 4 **c** 720° **d** 120° **e** 60° **3 a** yes **b** 360° **c** 18° **d** 162° **e** 3240° **4 a** SAS **b** 72° **5** 45°

© Pascal Press ISBN 978 1 74125 271 2