CHAPTER 6
Equations and formulae

EXCEL YEAR 8 MATHEMATICS
Ch. 6.2, p. 79

One-step equations (addition and subtraction)

QUESTION 1 Solve the following equations.

a $x + 3 = 11$

b $a + 9 = 25$

c $y - 5 = 16$

d $b + 7 = 17$

e $m + 3 = 23$

f $n - 9 = 21$

g $k + 1 = 36$

h $y + 3 = 22$

i $t - 5 = 17$

QUESTION 2 Solve the following one-step equations.

a $p - 3 = 15$

b $x - 5 = 18$

c $m - 6 = 31$

d $n - 1 = 5$

e $t - 4 = -7$

f $a - 3 = -8$

g $y + 7 = 9$

h $x - 3 = 28$

i $7 + a = 24$

j $x + 5 = 19$

k $a - 3 = 58$

l $m - 1 = -10$

QUESTION 3 Solve these equations.

a $a + 7 = 12$

b $n + 6 = 8$

c $x + 3 = 38$

d $b + 5 = 15$

e $p - 8 = 7$

f $a + 5 = 27$

g $m - 9 = 18$

h $t - 2 = 23$

i $y - 6 = 28$

j $x - 7 = 31$

k $a - 7 = 25$

l $12 + x = 41$

Equations and formulae

EXCEL YEAR 8 MATHEMATICS
Ch. 6.2, p. 79

One-step equations (multiplication and division)

QUESTION 1 Solve the following one-step equations.

a $5a = 35$

b $\frac{x}{7} = 3$

c $8y = 56$

d $\frac{a}{3} = 8$

e $\frac{y}{5} = 9$

f $9x = -45$

g $6m = 54$

h $\frac{t}{6} = -7$

i $8t = 72$

QUESTION 2 Solve the following equations.

a $\frac{x}{5} = 8$

b $7x = -49$

c $8x = 88$

d $4x = 48$

e $\frac{a}{9} = -3$

f $\frac{d}{5} = -5$

g $9x = -36$

h $\frac{a}{7} = 9$

i $11x = 121$

QUESTION 3 Solve these equations.

a $3a = 21$

b $-7x = -49$

c $\frac{p}{-9} = 8$

d $\frac{y}{3} = -6$

e $\frac{m}{6} = -4$

f $7x = -42$

g $5b = -125$

h $-2x = -18$

i $\frac{t}{-2} = 12$

j $\frac{y}{7} = 12$

k $\frac{n}{8} = 4$

l $-6x = 54$

Equations and formulae

EXCEL YEAR 8 MATHEMATICS
Ch. 6.3, p. 80

Two-step equations

QUESTION **1** Solve the following two-step equations.

a $2x + 3 = 7$ _____

b $3x - 5 = 4$ _____

c $5y - 10 = 5$ _____

d $\frac{6m}{5} = 12$ _____

e $\frac{x-2}{5} = 2$ _____

f $19 = 3a - 8$ _____

g $\frac{a}{2} - 2 = 8$ _____

h $4x - 5 = 19$ _____

i $\frac{x-5}{7} = 6$ _____

QUESTION **2** Solve the following equations.

a $2x + 7 = 31$ _____

b $6y - 4 = 26$ _____

c $3k + 1 = 22$ _____

d $\frac{a}{5} - 4 = 8$ _____

e $7p - 6 = 29$ _____

f $\frac{x}{3} - 3 = 11$ _____

g $5a - 3.6 = 7$ _____

h $8a - 2\frac{1}{2} = 5\frac{1}{2}$ _____

i $7b + 0.4 = 6.7$ _____

QUESTION **3** Solve these equations.

a $5x - 5 = 20$ _____

b $\frac{x}{4} + 9 = 13$ _____

c $\frac{x-2}{5} = 7$ _____

d $3y + 6 = 24$ _____

e $8y + 4 = -4$ _____

f $7y - 6 = 22$ _____

g $3t - 1 = 8$ _____

h $\frac{m-2}{4} = 6$ _____

i $3x - 3 = 24$ _____

j $2y + 9 = -3$ _____

k $3p + 7 = -14$ _____

l $2x - 5 = 11$ _____

Equations and formulae

EXCEL YEAR 8 MATHEMATICS
Ch. 6.4, p. 82

Three-step equations

QUESTION **1** Solve the following three-step equations.

a $3a - 7 = a + 5$

b $8x + 4 = 6x - 8$

c $4a - 11 = 7a - 17$

d $7t + 10 = 6t - 5$

e $12a + 18 = 4a - 14$

f $\frac{3y}{2} + 1 = 7$

g $3y + 9 = 6y - 3$

h $4 - 3x = 7 - 4x$

i $2m - 9 = 5m - 15$

QUESTION **2** Solve the following equations.

a $5x + 7 = 6x - 8$

b $3a + 10 = 24 + a$

c $6x - 3 = 2x + 13$

d $8a - 7 = 5a - 4$

e $x - 21 = 8x - 7$

f $14x - 28 = 32 - 6x$

g $5m - 3 = 2m + 9$

h $2x - 14 = x + 10$

i $5x + 13 = -5 - 4x$

QUESTION **3** Solve these equations.

a $7a - 14 = 5a + 42$

b $2x - 12 = x - 6$

c $6x - 27 = 3x + 9$

d $4y + 1 = 3y - 3$

e $8m - 7 = 7m + 9$

f $3x + 4 = 2x - 8$

g $5y - 7 = 3y + 9$

h $2y + 7 = y + 8$

i $3y - 5 = 2y + 7$

j $9t - 9 = 10t + 30$

k $2t + 5 = 5t + 4$

l $35x + 21 = -28x - 105$

Equations and formulae

EXCEL YEAR 8 MATHEMATICS
Ch. 6.5, p. 84

Equations with grouping symbols

QUESTION **1** Solve the following equations.

a $3(x+2)=6$

b $2(a+1)=8$

c $5(m-2)=25$

d $5(4a-3)=15a$

e $3(x+5)=18$

f $4(a-4)=24$

g $5(2x+3)=35$

h $3(m+2)=m+10$

i $2(3x+4)=24$

QUESTION **2** Solve these equations.

a $5(a-4)=70$

b $7(x+8)=-14$

c $4(2t-1)=24$

d $4(x+3)=30$

e $-3(a-4)=24$

f $5(2x+3)=45$

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

h $6(x-7)=5(x-2)$

i $8(x-3)=7(x+1)$

QUESTION **3** Solve the following equations.

a $4(x+5)+x+15=0$

b $6(x-3)=4(x+2)$

c $3(4a-2)=5(4a-2)$

d $4(a+3)=5(2+a)$

e $\frac{2a}{3}+7=15$

f $\frac{2a+5}{3}=9$

g $5(m-1)=4(m+3)$

h $7(t+2)=5(t+3)$

i $4(a+1)+a+5=19$

Equations and formulae

Equations with fractions

QUESTION **1** Solve the following equations.

a $\frac{x}{3}=\frac{1}{2}$ _____

b $\frac{a}{5}=\frac{1}{3}$ _____

c $\frac{3y}{5}=1\frac{1}{2}$ _____

d $\frac{a}{2}+\frac{a}{3}=15$ _____

e $\frac{m}{3}+\frac{m}{5}=8$ _____

f $\frac{x}{3}-\frac{x}{4}=7$ _____

g $\frac{a+7}{5}=3$ _____

h $\frac{4x}{5}=12$ _____

i $\frac{3x-4}{5}=7$ _____

QUESTION **2** Solve these equations.

a $\frac{m+5}{4}=8$ _____

b $\frac{m+2}{3}=7$ _____

c $\frac{2x}{7}=9$ _____

d $\frac{3m-4}{4}=20$ _____

e $\frac{m-5}{4}=6$ _____

f $\frac{3a-7}{4}=6$ _____

g $\frac{3p-9}{4}=6$ _____

h $\frac{3p-7}{2}=4$ _____

i $\frac{5x-4}{3}=12$ _____

QUESTION **3** Solve the following equations.

a $\frac{3x+2}{4}=8$ _____

b $\frac{2x}{3}+\frac{x}{6}=10$ _____

c $\frac{6p-5}{2}=8$ _____

d $\frac{a}{4}-\frac{a}{6}=8$ _____

e $\frac{8p}{15}-3=7$ _____

f $\frac{5a-2}{3}=6$ _____

g $\frac{m}{2}+\frac{m}{6}=3$ _____

h $\frac{8p}{15}+3=7$ _____

i $\frac{8a}{3}+1=9$ _____

j $\frac{a-5}{3}=4$ _____

k $\frac{k+2}{5}=6$ _____

l $\frac{m}{6}+4=21$ _____

Equations and formulae

EXCEL YEAR 8 MATHEMATICS
Ch. 6.8, p. 93

Formulae

QUESTION 1 Given that $A = \frac{1}{2}bh$, find A if:

a $b = 12, h = 4$ _____

b $b = 10, h = 7$ _____

c $b = 24, h = 5$ _____

d $b = 8, h = 10$ _____

e $b = 12, h = 9$ _____

f $b = 10, h = 13$ _____

g $b = 14, h = 9$ _____

h $b = 16, h = 14$ _____

i $b = 24, h = 7$ _____

QUESTION 2 Given that $A = \frac{1}{2}h(a+b)$, find A if:

a $h = 8, a = 3, b = 5$ _____

b $h = 6, a = 7, b = 9$ _____

c $h = 7, a = 8, b = 4$ _____

d $h = 9, a = 5, b = 7$ _____

e $h = 4, a = 3, b = 7$ _____

f $h = 10, a = 7, b = 9$ _____

g $h = 20, a = 11, b = 8$ _____

h $h = 5, a = 8, b = 9$ _____

i $h = 8, a = 11, b = 7$ _____

QUESTION 3 Given that $C = 2\pi r$, find C if $\pi = \frac{22}{7}$ and:

a $r = 7$ _____

b $r = 14$ _____

c $r = 21$ _____

d $r = 28$ _____

e $r = 35$ _____

f $r = 42$ _____

g $r = 9$ _____

h $r = 12$ _____

i $r = 15$ _____

QUESTION 4 Given that $A = \pi r^2$, find A if $\pi = \frac{22}{7}$ and:

a $r = 7$ _____

b $r = 14$ _____

c $r = 21$ _____

d $r = 28$ _____

e $r = 3$ _____

f $r = 5$ _____

g $r = 9$ _____

h $r = 11$ _____

i $r = 12$ _____

QUESTION 5 Given that $P = 2L + 2B$, find P if:

a $L = 11, B = 9$ _____

b $L = 7, B = 5$ _____

c $L = 14, B = 10$ _____

d $L = 13, B = 7$ _____

e $L = 16, B = 9$ _____

f $L = 12, B = 6$ _____

Equations and formulae

Equations rising from substitution in formulae

QUESTION 1 For the formula $A = \frac{1}{2}bh$, find h if:

a $A = 40, b = 8$ _____ **b** $A = 35, b = 10$ _____ **c** $A = 18, b = 6$ _____

d $A = 36, b = 12$ _____ **e** $A = 32, b = 8$ _____ **f** $A = 14, b = 4$ _____

g $A = 24, b = 8$ _____ **h** $A = 27, b = 6$ _____ **i** $A = 20, b = 5$ _____

QUESTION 2 For the formula $A = \frac{1}{2}h(a+b)$, find h if:

a $a = 3, b = 5, A = 20$ _____ **b** $a = 3, b = 7, A = 15$ _____ **c** $a = 2, b = 8, A = 35$ _____

d $a = 4, b = 6, A = 30$ _____ **e** $a = 5, b = 7, A = 24$ _____ **f** $a = 9, b = 11, A = 50$ _____

g $a = 5, b = 9, A = 42$ _____ **h** $a = 4, b = 8, A = 54$ _____ **i** $a = 5, b = 7, A = 30$ _____

QUESTION 3 For the formula $C = 2\pi r$, find r in terms of π if:

a $C = 14$ _____ **b** $C = 42$ _____ **c** $C = 78$ _____

d $C = 26$ _____ **e** $C = 54$ _____ **f** $C = 90$ _____

g $C = 38$ _____ **h** $C = 66$ _____ **i** $C = 94$ _____

QUESTION 4 For the formula $A = \pi r^2$, find r in terms of π if:

a $A = 10$ _____ **b** $A = 28$ _____ **c** $A = 57$ _____

d $A = 15$ _____ **e** $A = 32$ _____ **f** $A = 63$ _____

g $A = 20$ _____ **h** $A = 46$ _____ **i** $A = 72$ _____

QUESTION 5 For the formula $P = 2L + 2B$, find L if:

a $P = 50, B = 8$ _____ **b** $P = 60, B = 10$ _____ **c** $P = 48, B = 6$ _____

d $P = 80, B = 12$ _____ **e** $P = 72, B = 6$ _____ **f** $P = 108, B = 24$ _____

Equations and formulae

Problem solving with equations

In the following questions suppose the number is represented by x. Write the statement as an equation and find the value of x.

1 What number plus 8 is equal to 15?

2 What number minus 6 is equal to 17?

3 Twice a number equals −10. What is the number?

4 What number divided by 5 is equal to 6?

5 Seven less a number equals 12. What is the number?

6 When a number is increased by 5 the result is 14. What is the number?

7 When a number is decreased by 4 the result is 3. What is the number?

8 The product of a number and 5 is −8. What is the number?

9 When a number is doubled the result is 18. What is the number?

10 The difference between three times a number and 8 is 16. What is the number?

11 I think of a number, divide it by 5, subtract 3 and the result is 8. What is the number?

12 The length of a rectangle is 12 cm and its perimeter is 36 cm. What is the width?

13 If the perimeter of an equilateral triangle is 48 cm, what is the length of each side?

14 A rectangle is 7 cm longer than it is wide. If the perimeter is 38 cm, find the length and width of the rectangle.

15 I think of a number, add 5 to it, multiply this sum by 3 and then subtract 8. The result is 37. What is the number?

TOPIC TEST

PART A

Instructions
- This part consists of 15 multiple choice questions
- Fill in only ONE CIRCLE for each question
- Each question is worth 1 mark
- Calculators may be used

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

Marks

1 If $2x - y = 7$ then the value of y when $x = 3$ is

Ⓐ -13 Ⓑ -1 Ⓒ 1 Ⓓ 13 [1]

2 If $\frac{a}{3} - 2 = 5$ then a equals

Ⓐ 7 Ⓑ 11 Ⓒ 17 Ⓓ 21 [1]

3 If $2x - 5 = 23$ then x equals

Ⓐ 8 Ⓑ 9 Ⓒ 14 Ⓓ 28 [1]

4 If $4(3t - 5) = 6t - 14$ then t equals

Ⓐ 2 Ⓑ -1 Ⓒ -2 Ⓓ 1 [1]

5 If $7x - 3(x - 1) = 9$ then x equals

Ⓐ $2\frac{1}{2}$ Ⓑ $\frac{1}{2}$ Ⓒ $1\frac{1}{2}$ Ⓓ $3\frac{1}{2}$ [1]

6 Solve the equation $3P = -5(1000 - P)$

Ⓐ $P = 2500$ Ⓑ $P = 2000$ Ⓒ $P = 3000$ Ⓓ $P = 15\,000$ [1]

7 Solve $3(x + 5) - 2(x - 4) = 0$

Ⓐ $x = -10$ Ⓑ $x = -23$ Ⓒ $x = -25$ Ⓓ $x = -16$ [1]

8 Solve $3(x - 1) - 1 = 35$

Ⓐ $x = 39$ Ⓑ $x = 10$ Ⓒ $x = 13$ Ⓓ $x = 12$ [1]

9 Find the value of $\frac{2Rr}{R + r}$ when $R = 9.6$ and $r = 4.8$

Ⓐ 6.4 Ⓑ 2.3 Ⓒ 8.9 Ⓓ 14.4 [1]

Marks

10 Solve $4(x - 2) - 3(x + 4) = 16$

Ⓐ $x = 36$ Ⓑ $x = 12$ Ⓒ $x = 14$ Ⓓ $x = -4$ [1]

11 Solve for x: $3(2x - 7) = 4x - 11$

Ⓐ $x = 16$ Ⓑ $x = 5$ Ⓒ $x = 3.2$ Ⓓ $x = 8$ [1]

12 If $\frac{3x - 4}{5} = 7$ then x equals

Ⓐ $6\frac{1}{5}$ Ⓑ 13 Ⓒ 12 Ⓓ none of these [1]

13 If $5(3x - 4) - (2x - 1) = 5$ then x equals

Ⓐ $\frac{13}{24}$ Ⓑ $\frac{1}{2}$ Ⓒ $\frac{8}{13}$ Ⓓ $\frac{24}{13}$ [1]

14 If $10x - 3(x - 4) = 8$ then x equals

Ⓐ $2\frac{6}{7}$ Ⓑ $1\frac{5}{12}$ Ⓒ $\frac{4}{7}$ Ⓓ $\frac{-4}{7}$ [1]

15 The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$. A sphere with a radius of 300 mm will have a volume of

Ⓐ 0.1 m^3 (1 d.p.) Ⓑ 1131 mm^3 (4 s.f.)

Ⓒ 113 cm^3 (3 s.f.) Ⓓ 400π mm^3 [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 answers in the 'Answers only' column

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

Questions	Answers only	Marks
Solve the following equations.		
1 $x + 6 = -2$		1
2 $\frac{y}{3} - 2 = 7$		1
3 $2(m + 2) = 11$		1
4 $8 - 5x = 14 - 2x$		1
5 $5x = -10$		1
6 $\frac{2}{3}a = 20$		1
7 $\frac{x+5}{12} - \frac{x+3}{8} = 1$		1
8 $7a + 5 = 33$		1
9 $4x = 5x - 9$		1
10 $\frac{2x}{3} + 6 = 11$		1
11 $6(2x - 3) = 54$		1
12 $\frac{5x+3}{4} = \frac{7x-5}{3}$		1
13 $3(2x - 5) - 2(x - 3) = 30$		1
14 $3y - 1 = 2 - y$		1
15 $\frac{2a-7}{4} = 2$		1

Total marks achieved for PART B 15

TOPIC TEST

PART C

Instructions
- This part consists of 4 questions
- Each question is worth 5 marks
- Show all necessary working

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

Marks

1 Solve the following equations.

a $x + 7 = 15$ _____ **b** $3x = -18$ _____

c $\frac{p}{5} = 9$ _____ **d** $a - 7 = 20$ _____

e $5x + 12 = 27$ _____

5

2 Solve.

a $\frac{2m+5}{3} = 2$ _____ **b** $8m + 3 = 5m + 18$ _____

c $19 - 6b = 3 + 2b$ _____ **d** $7(2a + 1) = 5a - 7$ _____

e $\frac{2x-3}{4} = \frac{x+7}{3}$ _____

5

3 Solve the following.

a $x + 5 < 14$ _____ **b** $y - 3 > 4$ _____

c $\frac{x}{5} < 3$ _____ **d** $6x + 3 < 19$ _____

e $6 - 2x \geq x - 10$ _____

5

4 Solve for x.

a $4 - 5x = 2x + 1$ _____ **b** $\frac{x+6}{3} = 8$ _____

c $\frac{x+5}{4} = \frac{2x+7}{5}$ _____ **d** $3x - 2 = 4 - 2x$ _____

e $3(2x + 5) - 2(x - 3) = 30$ _____

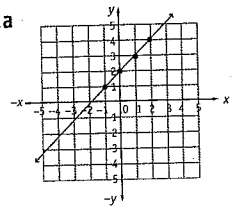
5

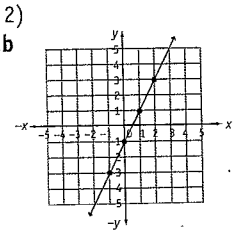
Total marks achieved for PART C ____/20

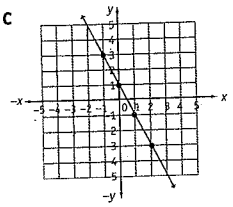
Answers

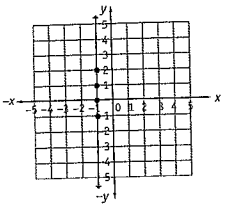
e 5 units **f** 12 units **g** 6 units^2 **4 a** (0, 5), (1, 6), (2, 7), (3, 8) **b** (−1, 1), (0, 3), (1, 5), (2, 7) **c** (−1, −5), (0, −2), (1, 1), (2, 4)

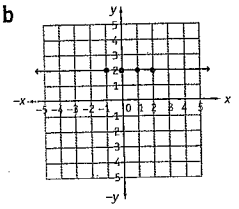
PAGE 56 **1 a** (−1, 1), (0, 2), (1, 3), (2, 4) **b** (−1, −3), (0, −1), (1, 1), (2, 3) **c** (−1, 3), (0, 1), (1, −1), (2, −3) **2 a** (−1, −1), (−1, 0), (−1, 1); (−1, 2) **b** (−1, 2), (0, 2), (1, 2), (2, 2) **c** (−4, −1), (−4, 0), (−4, 1), (−4, 2) **3 a** (−1, −2), (0, 0), (1, 2), (2, 4); (−1, 2), (0, 0), (1, −2), (2, −4); the point of intersection is (0, 0) **b** (−1, 0), (0, 2), (1, 4), (2, 6); (−1, 1), (0, 2), (1, 3), (2, 4); the point of intersection is (0, 2)

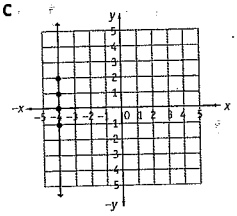
1a 

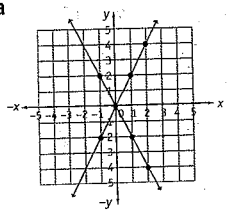
1b 

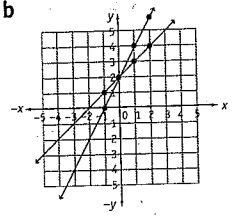
1c 

2a 

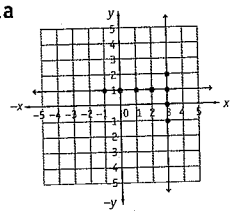
2b 

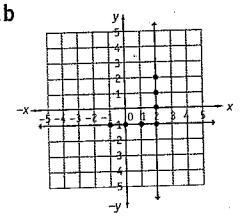
2c 

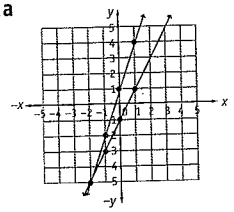
3a 

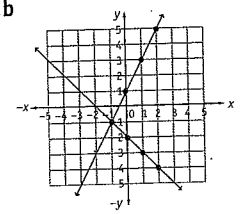
3b 

PAGE 57 **1 a** (3, −1), (3, 0), (3, 1), (3, 2); (−1, 1), (0, 1), (2, 1), (3, 1); the point of intersection is (3, 1) **b** (2, −1), (2, 0), (2, 1), (2, 2); (−1, −1), (0, −1), (1, −1), (2, −1); the point of intersection is (2, −1) **2 a** (−2, −5), (−1, −2), (0, 1), (1, 4); (−2, −5), (−1, −3), (0, −1), (1, 1); the point of intersection is (−2, −5) **b** (−1, −1), (0, 1), (1, 3), (2, 5); (−1, −1), (0, −2), (1, −3), (2, −4); the point of intersection is (−1, −1)

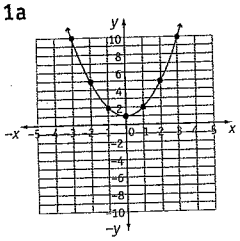
1a 

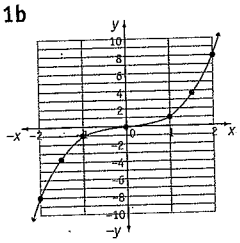
1b 

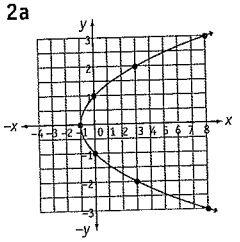
2a 

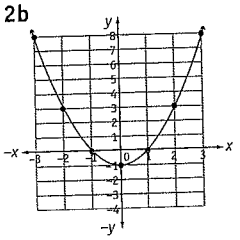
2b 

PAGE 58 **1 a** (−3, 10), (−2, 5), (−1, 2), (0, 1), (1, 2), (2, 5), (3, 10) **b** (−2, −8), (−1.5, −3.375), (−1, −1), (−0.5, −0.125), (0, 0), (0.5, 0.125), (1, 1), (1.5, 3.375), (2, 8) **2 a** (8, −3), (3, −2), (0, −1), (−1, 0), (0, 1), (3, 2), (8, 3) **b** (−3, 8), (−2, 3), (−1, 0), (0, −1), (1, 0), (2, 3), (3, 8)

1a 

1b 

2a 

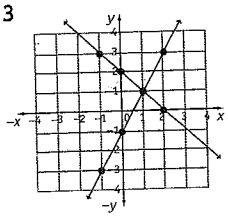
2b 

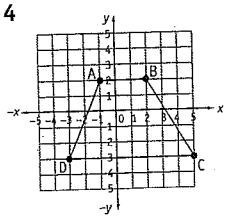
PAGE 59 **1 a** 3: 4 **b** 4:7 **2 a** 4:5 **b** 5:4 **3** 80 km/h **4** $240, $320 **5 a** 4:9 **b** 3:8 **6** 120 km/h **7** 30 cents **8** 3:4 **9** $4000 **10** 30°, 60° **11** 25 kg/s

PAGES 60 & 61 **1** D **2** B **3** D **4** C **5** B **6** B **7** C **8** C **9** B **10** B **11** D **12** C **13** D **14** B **15** B

PAGE 62 **1** 4:5 **2** 1:6 **3** 2:7 **4** $65 **5** 50 m **6** 1:4 **7** 12:7 **8** $33\frac{1}{3}$ m/s **9** 13 h 20 min **10** 256 m, 384 m **11** $54.60 **12** p:$2q$ **13** 4.8 **14** 22.8 L **15** 40°

PAGE 63 **1 a** 1:25 **b** 98 **c** $30 **d** 4 h 40 min **e** $138.40 **2 a** 10 **b** 1:13 **c** 88 cm **d** 20 km/h **e** 0.6 km/min **3 a** (−1, 3), (0, 2), (1, 1), (2, 0) **b** (−1, −3), (0, −1), (1, 1), (2, 3) **c** see diagram **d** point of intersection is (1, 1) **4 a** see diagram **b** see diagram **c** trapezium **d** 3:8

3 

4 

Answers

PAGE 64 **1** **a** $x = 8$ **b** $a = 16$ **c** $y = 21$ **d** $b = 10$ **e** $m = 20$ **f** $n = 30$ **g** $k = 35$ **h** $y = 19$ **i** $t = 22$ **2** **a** $p = 18$ **b** $x = 23$ **c** $m = 37$ **d** $n = 6$ **e** $t = -3$ **f** $a = -5$ **g** $y = 2$ **h** $x = 31$ **i** $a = 17$ **j** $x = 14$ **k** $a = 61$ **l** $m = -9$ **3** **a** $a = 5$ **b** $n = 2$ **c** $x = 35$ **d** $b = 10$ **e** $p = 15$ **f** $a = 22$ **g** $m = 27$ **h** $t = 25$ **i** $y = 34$ **j** $x = 38$ **k** $a = 32$ **l** $x = 29$

PAGE 65 **1** **a** $a = 7$ **b** $x = 21$ **c** $y = 7$ **d** $a = 24$ **e** $y = 45$ **f** $x = -5$ **g** $m = 9$ **h** $t = -42$ **i** $t = 9$ **2** **a** $x = 40$ **b** $x = -7$ **c** $x = 11$ **d** $x = 12$ **e** $a = -27$ **f** $d = -25$ **g** $x = -4$ **h** $a = 63$ **i** $x = 11$ **3** **a** $a = 7$ **b** $x = 7$ **c** $p = -72$ **d** $y = -18$ **e** $m = -24$ **f** $x = -6$ **g** $b = -25$ **h** $x = 9$ **i** $t = -24$ **j** $y = 84$ **k** $n = 32$ **l** $x = -9$

PAGE 66 **1** **a** $x = 2$ **b** $x = 3$ **c** $y = 3$ **d** $m = 10$ **e** $x = 12$ **f** $a = 9$ **g** $a = 20$ **h** $x = 6$ **i** $x = 47$ **2** **a** $x = 12$ **b** $y = 5$ **c** $k = 7$ **d** $a = 60$ **e** $p = 5$ **f** $x = 42$ **g** $a = 2.12$ **h** $a = 1$ **i** $b = 0.9$ **3** **a** $x = 5$ **b** $x = 16$ **c** $x = 37$ **d** $y = 6$ **e** $y = -1$ **f** $y = 4$ **g** $t = 3$ **h** $m = 26$ **i** $x = 9$ **j** $y = -6$ **k** $p = -7$ **l** $x = 8$

PAGE 67 **1** **a** $a = 6$ **b** $x = -6$ **c** $a = 2$ **d** $t = -15$ **e** $a = -4$ **f** $y = 4$ **g** $y = 4$ **h** $x = 3$ **i** $m = 2$ **2** **a** $x = 15$ **b** $a = 7$ **c** $x = 4$ **d** $a = 1$ **e** $x = -2$ **f** $x = 3$ **g** $m = 4$ **h** $x = 24$ **i** $x = -2$ **3** **a** $a = 28$ **b** $x = 6$ **c** $x = 12$ **d** $y = -4$ **e** $m = 16$ **f** $x = -12$ **g** $y = 8$ **h** $y = 1$ **i** $y = 12$ **j** $t = -39$ **k** $t = \frac{1}{3}$ **l** $x = -2$

PAGE 68 **1** **a** $x = 0$ **b** $a = 3$ **c** $m = 7$ **d** $a = 3$ **e** $x = 1$ **f** $a = 10$ **g** $x = 2$ **h** $m = 2$ **i** $x = 2\frac{2}{3}$ **2** **a** $a = 18$ **b** $x = -10$ **c** $t = 3\frac{1}{2}$ **d** $x = 4\frac{1}{2}$ **e** $a = -4$ **f** $x = 3$ **g** $a = -32$ **h** $x = 32$ **i** $x = 31$ **3** **a** $x = -7$ **b** $x = 13$ **c** $a = \frac{1}{2}$ **d** $a = 2$ **e** $a = 12$ **f** $a = 11$ **g** $m = 17$ **h** $t = \frac{1}{2}$ **i** $a = 2$

PAGE 69 **1** **a** $x = 1\frac{1}{2}$ **b** $a = 1\frac{2}{3}$ **c** $y = 2\frac{1}{2}$ **d** $a = 18$ **e** $m = 15$ **f** $x = 84$ **g** $a = 8$ **h** $x = 15$ **i** $x = 13$ **2** **a** $m = 27$ **b** $m = 19$ **c** $x = 31\frac{1}{2}$ **d** $m = 28$ **e** $m = 29$ **f** $a = 10\frac{1}{3}$ **g** $p = 11$ **h** $p = 5$ **i** $x = 8$ **3** **a** $x = 10$ **b** $x = 12$ **c** $p = 3\frac{1}{2}$ **d** $a = 96$ **e** $p = 18\frac{3}{4}$ **f** $a = 4$ **g** $m = 4\frac{1}{2}$ **h** $p = 7\frac{1}{2}$ **i** $a = 3$ **j** $a = 17$ **k** $k = 28$ **l** $m = 102$

PAGE 70 **1** **a** 24 **b** 35 **c** 60 **d** 40 **e** 54 **f** 65 **g** 63 **h** 112 **i** 84 **2** **a** 32 **b** 48 **c** 42 **d** 54 **e** 20 **f** 80 **g** 190 **h** $42\frac{1}{2}$ **i** 72 **3** **a** 44 **b** 88 **c** 132 **d** 176 **e** 220 **f** 264 **g** $56\frac{4}{7}$ **h** $75\frac{3}{7}$ **i** $94\frac{2}{7}$ **4** **a** 154 **b** 616 **c** 1386 **d** 2464 **e** $28\frac{2}{7}$ **f** $78\frac{4}{7}$ **g** $254\frac{4}{7}$ **h** $380\frac{2}{7}$ **i** $452\frac{4}{7}$ **5** **a** 40 **b** 24 **c** 48 **d** 40 **e** 50 **f** 36

PAGE 71 **1** **a** 10 **b** 7 **c** 6 **d** 6 **e** 8 **f** 7 **g** 6 **h** 9 **i** 8 **2** **a** 5 **b** 3 **c** 7 **d** 6 **e** 4 **f** 5 **g** 6 **h** 9 **i** 5 **3** **a** $\frac{7}{\pi}$ **b** $\frac{21}{\pi}$ **c** $\frac{39}{\pi}$ **d** $\frac{13}{\pi}$ **e** $\frac{27}{\pi}$ **f** $\frac{45}{\pi}$ **g** $\frac{19}{\pi}$ **h** $\frac{33}{\pi}$ **i** $\frac{47}{\pi}$ **4** **a** $\sqrt{\frac{10}{\pi}}$ **b** $\sqrt{\frac{28}{\pi}}$ **c** $\sqrt{\frac{57}{\pi}}$ **d** $\sqrt{\frac{15}{\pi}}$ **e** $\sqrt{\frac{32}{\pi}}$ **f** $\sqrt{\frac{63}{\pi}}$ **g** $\sqrt{\frac{20}{\pi}}$ **h** $\sqrt{\frac{46}{\pi}}$ **i** $\sqrt{\frac{72}{\pi}}$ **5** **a** 17 **b** 20 **c** 18 **d** 28 **e** 30 **f** 30

PAGE 72 **1** $x + 8 = 15$; $x = 7$ **2** $x - 6 = 17$; $x = 23$ **3** $2x = -10$; $x = -5$ **4** $\frac{x}{5} = 6$; $x = 30$ **5** $x - 7 = 12$; $x = 19$ **6** $x + 5 = 14$; $x = 9$ **7** $x - 4 = 3$; $x = 7$ **8** $5x = -8$; $x = \frac{-8}{5}$ **9** $2x = 18$; $x = 9$ **10** $3x - 8 = 16$; $x = 8$ **11** $\frac{x}{5} - 3 = 8$; $x = 55$ **12** $2x + 24 = 36$; $x = 6$ **13** $3x = 48$; $x = 16$ **14** $4x + 14 = 38$; $x = 6$ **15** $3(x + 5) - 8 = 37$; $x = 10$

PAGES 73 & 74 **1** B **2** D **3** C **4** D **5** C **6** A **7** B **8** C **9** A **10** A **11** B **12** B **13** D **14** D **15** A

PAGE 75 **1** $x = -8$ **2** $y = 27$ **3** $m = 3\frac{1}{2}$ **4** $x = -2$ **5** $x = -2$ **6** $a = 30$ **7** $x = -23$ **8** $a = 4$ **9** $x = 9$ **10** $x = 7\frac{1}{2}$ **11** $x = 6$ **12** $x = 2\frac{3}{13}$ **13** $x = 9\frac{3}{4}$ **14** $y = \frac{3}{4}$ **15** $a = 7\frac{1}{2}$

PAGE 76 **1** **a** $x = 8$ **b** $x = -6$ **c** $p = 45$ **d** $a = 27$ **e** $x = 3$ **2** **a** $m = \frac{1}{2}$ **b** $m = 5$ **c** $b = 2$ **d** $a = -1\frac{5}{9}$ **e** $x = 18\frac{1}{2}$ **3** **a** $x < 9$ **b** $y > 7$ **c** $x < 15$ **d** $x < 2\frac{2}{3}$ **e** $x \leq 5\frac{1}{3}$ **4** **a** $x = \frac{3}{7}$ **b** $x = 18$ **c** $x = -1$ **d** $x = 1\frac{1}{5}$ **e** $x = 2\frac{1}{4}$

PAGE 77 **1** **a** centre **b** radius **c** diameter **d** arc **e** chord **2** **a** semi-circle **b** minor segment **c** major segment **d** sector **e** tangent **f** secant **3** **a** circumference **b** concentric circles **c** quadrant **4** **a** $\frac{1}{4}$ **b** $\frac{1}{2}$ **c** $\frac{3}{4}$ **d** $\frac{1}{6}$ **5** **a** 8 cm **b** 15 cm **c** $C = 2\pi r$ **d** $A = \pi r^2$ **e** four

PAGE 78 **1** All answers in cm. **a** $18\frac{6}{7}$ **b** 44 **c** $37\frac{5}{7}$ **d** $31\frac{3}{7}$ **e** $50\frac{2}{7}$ **f** $62\frac{6}{7}$ **2** All answers in cm. **a** 25.13 **b** 56.55 **c** 69.12 **d** 75.40 **e** 87.96 **f** 81.68 **3** All answers in cm. **a** 94.2 **b** 132 **c** 176 **d** 220 **e** 151 **f** 163 **4** **a** 169.65 units **b** 263.89 units **c** 119.38 units

PAGE 79 **1** **a** $18\frac{6}{7}$ cm **b** $25\frac{1}{7}$ m **c** $47\frac{1}{7}$ cm **d** $15\frac{5}{7}$ m **e** 22 m **f** 44 m **2** **a** 56.55 cm **b** 37.70 cm **c** 31.42 cm **d** 78.54 m **e** 53.41 cm **f** 109.96 cm **3** **a** 141 cm **b** 50.2 cm **c** 59.7 cm **d** 69.1 cm **e** 81.6 m **f** 107 m **4** **a** 115.7 cm **b** 28.6 cm **c** 44.8 cm