



PLANNER & TRACKER

Mathematics Grade 8

- *Progress tracker*
- *Intervention strategies*
- *Worksheets and exam papers*
- *Assessment support*
- *Key vocabulary*



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The worksheets in this Teacher's Resource Book were compiled for use with the *Oxford Successful Mathematics* Grade 8 Learner's Book. The worksheets were adapted from the *Oxford Let's Practise Mathematics* Grade 8 Practice Book.

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(The page numbers in brackets refer to the *Oxford Successful Mathematics* Grade 8 Learner's Book.)

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TERM 1

Progress tracker for Oxford Successful Mathematics Grade 8

Week	Contents and concepts (based on 2023/24 ATPs)	Worksheet name and page number	Learner's Book chapter and page reference	Planned time allocation	Date of completion	Teacher reflection
1–3	Whole numbers <ul style="list-style-type: none"> • Properties of whole numbers • Calculations using whole numbers • Calculation techniques • Multiples and factors • Solving problems 	Worksheet: Times tables, prime numbers and properties (p. 8)	Chapter 1 LB: pp. 10–16	11,5 hours		
4–5	Integers <ul style="list-style-type: none"> • Calculations with integers • Properties of integers 	Worksheet: Counting, ordering and comparing (p. 9)	Chapter 2 LB: pp. 37–39	9 hours		
6	Formal assessment task			2 hours		
6–8	Common fractions <ul style="list-style-type: none"> • Calculations with fractions • Calculation techniques • Percentage • Solving problems 	Worksheet: Addition and subtraction including mixed numbers (p. 10)	Chapter 10 LB: pp. 203–207	9 hours		
8–9	Decimal fractions <ul style="list-style-type: none"> • Calculations with decimal fractions • Calculation techniques • Solving problems 	Worksheet: Ordering and comparing; addition and subtraction (p. 11)	Chapter 11 LB: pp. 225–229	7 hours		
10	Revision			4,5 hours OR 2,5 hours		
11	Assessment			2,5 hours OR 4,5 hours		

TERM 2

Progress tracker for Oxford Successful Mathematics Grade 8

Week	Contents and concepts (based on 2023/24 ATPs)	Worksheet name and page number	Learner's Book chapter and page reference	Planned time allocation	Date of completion	Teacher reflection
1–3	Exponents <ul style="list-style-type: none"> Comparing and representing numbers in exponential form Calculations using numbers in exponential form Solving problems 	Worksheet: Squares and cubes (p. 12)	Chapter 3 LB: pp. 59–60	9 hours		
4–6	Numeric and geometric patterns <ul style="list-style-type: none"> Investigate and extend patterns 	Worksheet: Investigate and extend patterns (p. 13)	Chapter 4 LB: pp. 74–77	9 hours		
6–8	Functions and relationships <ul style="list-style-type: none"> Input and output values Equivalent forms 	Worksheet: Input and output values. (p. 14)	Chapter 15 LB: pp. 326–334	8 hours		
8–9	Algebraic expressions <ul style="list-style-type: none"> Algebraic language Expand and simplify algebraic expressions 	Worksheet: Algebraic language; conventions (p. 15)	Chapter 5 LB: pp. 92–95	6,5 hours		
10	Revision			4 hours		
11	Assessment			4 hours		

TERM 3

Progress tracker for Oxford Successful Mathematics Grade 8

Week	Contents and concepts (based on 2023/24 ATPs)	Worksheet name and page number	Learner's Book chapter and page reference	Planned time allocation	Date of completion	Teacher reflection
1–2	Algebraic expressions <ul style="list-style-type: none"> Expand and simplify algebraic expressions (Take time to allocate and explain the formal assessment task: Project)	Worksheet: Simplify algebraic expressions; squares and cubes (p. 16)	Chapter 6 LB: pp. 121–125	9 hours		
3–4	Algebraic equations <ul style="list-style-type: none"> Equations 	Worksheet: Solve equations (p. 17)	Chapter 16 LB: pp. 346–353	8 hours		
5–6	Geometry of straight lines <ul style="list-style-type: none"> Angle relationships Solving problems 	Worksheet: Perpendicular and intersecting lines (p. 18)	Chapter 9 LB: pp. 183–190	9 hours		
7–9	Geometry of 2D shapes <ul style="list-style-type: none"> Classifying triangles Constructions (triangles) Classifying quadrilaterals Constructions (quadrilaterals) Investigate properties of geometric figures Solving problems (triangles and quadrilaterals) Similar and congruent 2D shapes 	Worksheet: Classify triangles (p. 19)	Chapter 8 LB: pp. 161–167	12,5 hours		
10	Revision			4 hours		
11	Assessment			4 hours		

TERM 4

Progress tracker for Oxford Successful Mathematics Grade 8

Week	Contents and concepts (based on 2023/24 ATPs)	Worksheet name and page number	Learner's Book chapter and page reference	Planned time allocation	Date of completion	Teacher reflection
1–2	Graphs <ul style="list-style-type: none"> Interpreting graphs Drawing graphs 	Worksheet: Transform points on the Cartesian plane (p. 20)	Chapter 17 LB: pp. 388–392	8 hours		
3–4	Theorem of Pythagoras <ul style="list-style-type: none"> Develop and use the Theorem of Pythagoras 	Worksheet: Using Pythagoras to solve triangles (p. 21)	Chapter 12 LB: pp. 252–255	9 hours		
5–6	Area and perimeter of 2D shapes <ul style="list-style-type: none"> Area and perimeter Calculations and solving problems 	Worksheet: Simple examples of area and perimeter (p. 22)	Chapter 13 LB: pp. 259–265	9 hours		
7	Revision			3,5 hours		
8–10	Assessment			12 hours		

Times tables, prime numbers and properties

Learner's Book pages 10–16

1. Fill in the missing values.

a) $7 \times 6 = \square$

b) $9 \times \square = 108$

c) $\square \times 11 = 121$

d) $63 \div 9 = \square$

e) $132 \div \square = 1$

f) $\square \div 4 = 8$

g) $5 \times 8 = \square$

h) $98 \times \square = 98$

i) $\square \times 9 = 27$

j) $144 \div 0 = \square$

k) $72 \div \square = 72$

l) $\square \div 7 = 0$

2. Compare the following numbers. Fill in < or >.

a) 2 407 \square 2 470

b) 59 823 \square 59 623

c) 348 921 \square 384 921



Tip

Prime numbers are special numbers in maths. They only ever have 2 factors!



Reminder

When comparing numbers, always remember to compare numbers with the corresponding place value.

3. True or false? If false, explain why.

a) 1 is not a prime number. \square

b) All the prime numbers are even numbers. \square

c) 0 is the identity element for addition. \square

d) If $27 + 23 = 50$, then $27 - 50 = 23$, because addition and subtraction are inverse operations. \square

4. Fill in the missing operators (+; −; × or ÷) to make the statements true.

a) $89 \square 43 = 43 + 89$

d) $29 \times (71 \square 47) = (29 \times 71) \square 47$

b) $73 \times 41 = 41 \square 73$

e) $61(79 \square 23) = (61 \times 79) + (61 \square 23)$

c) $(59 \square 31) + 83 = 59 \square (31 + 83)$

f) $(53 \square 67) \square (53 \square 37) = 53 \square (67 - 37)$

5. Arrange all the prime numbers between 40 in 71 in descending order.

6. Moira and Jabu made mistakes in their maths homework. Show them the correct calculations.

Moira: $7(12 - 9) = 7 \times 12 - 7 \times 9$
 $= 7 \times 5 \times 9$
 $= 315$

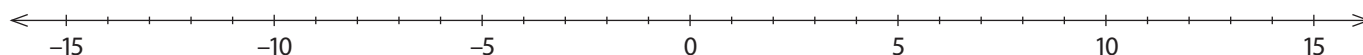
Jabu: $2 \times 12 \times 8 = 2 \times 12 + 2 \times 8$
 $= 24 + 16$
 $= 40$

Counting, ordering and comparing

Learner's Book pages 37–39

1. a) Circle all the integers. -4 ; π ; 15 ; 0 ; $\frac{7}{8}$; -11 ; $1,25$; $\frac{12}{2}$; $-3,0$; $-\frac{3}{5}$

b) Plot the integers on this number line.



2. Fill in $<$ or $>$ between each pair of numbers.

a) 120 75

b) 75 120

c) -120 -75

d) -75 -120

3. The following temperatures were recorded on a winter's morning.

10°C	-8°C	0°C	-5°C	4°C	-6°C
8°C	-2°C	-14°C	1°C	12°C	-11°C

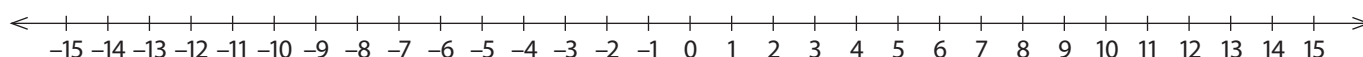
Complete.

a) The coldest temperature was . b) The hottest temperature was .

c) Arrange the temperatures below freezing point in ascending order.

d) Arrange the temperatures above freezing point in descending order.

Use the following number line to answer Questions 4 and 5.



4. Write down the number that is exactly in the middle of each of the following pairs.

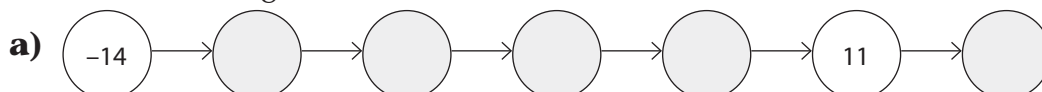
a) 3 and 13

b) -11 and -5

c) 6 and -8

d) -14 and 6

5. Fill in the missing numbers.



Addition and subtraction including mixed numbers

Learner's Book pages 203–207

1. Fill in the missing values.

$$\frac{3}{5} = \frac{6}{\square} = \frac{\square}{20} = \frac{24}{\square} = \frac{\square}{50} = \frac{\square}{10} = \frac{18}{\square}$$

2. Convert between improper fractions and mixed numbers.

a) $4\frac{3}{8} = \square$

b) $-5\frac{7}{10} = -\square$

c) $\square = -\frac{20}{3}$

d) $\square = -\frac{47}{6}$

e) $\square = \frac{54}{8}$

f) $9\frac{3}{4} = \square$

3. Simplify. (Show all the steps.)

a) $\frac{19}{12} - \frac{3}{4} + 8\frac{1}{2}$

b) $\frac{3}{7} + 2\frac{3}{21} - 5\frac{1}{3}$

c) $1\frac{7}{15} - 2\frac{1}{3} + 3\frac{5}{6}$

d) $3\frac{3}{10} - (4\frac{3}{5} + 3\frac{1}{20})$

e) $\frac{2a}{11} + \frac{a}{11} + \frac{4a}{11}$

f) $\frac{5}{b} - \frac{3}{b} + \frac{2}{b}$

4. Sue spent $\frac{3}{8}$ of her pocket money on snacks and $\frac{7}{24}$ on airtime. What fraction of her pocket money is left for other expenses?



Reminder

We can only add and subtract fractions with the same denominators.

Ordering and comparing; addition and subtraction

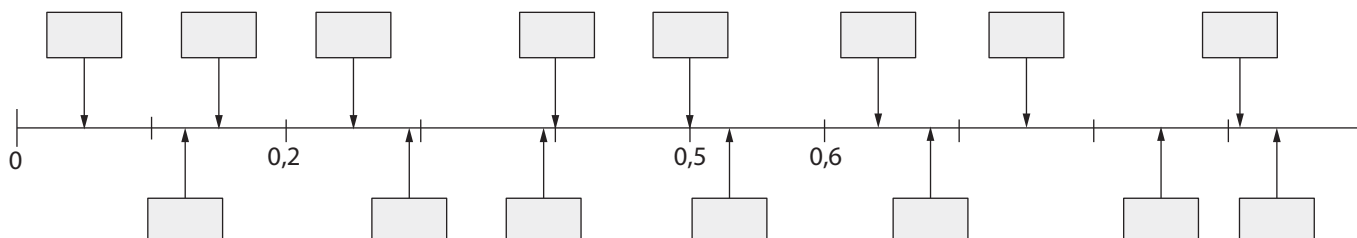
Learner's Book pages 225–229



Reminder

Decimal fractions are common fractions with denominators in powers of 10.

1. a) Complete the scale on the number line.



b) Now fill in the following values in their correct positions on the number line.

0,5	91%	$\frac{4}{10}$	0,125	0,85	0,05	53%	0,63	15%
$\frac{3}{4}$	0,25	0,94	0,29	0,68	$\frac{39}{100}$			

2. Follow the instructions in the top row of each table. (Work from left to right.)

a) Given number	Round off to 2 decimal places	Arrange the numbers in column 2 in descending order
5,3148		
5,128		
5,084		
5,3244		
5,245		
5,2301		

b) Given number	Round off to 3 decimal places	Arrange the numbers in column 2 in ascending order
–12,3846		
–11,89233		
–12,0104		
–11,536801		
–12,00159		
–11,99951		

3. In each of the following addition calculations, cross out one line to make the answer true.

a)

$$\begin{array}{r} 34,267 \\ 101,79 \\ 25,0124 \\ 1,491 \\ 5,338 \\ \hline 166,4074 \end{array}$$

b)

$$\begin{array}{r} -3\,582,8921 \\ -751,403 \\ -10\,150,05 \\ -4\,863,4711 \\ -26,81 \\ -4,69 \\ \hline -18\,627,9132 \end{array}$$

c)

$$\begin{array}{r} 1\,893,6003 \\ 1\,694,501 \\ -248,05 \\ 87,4629 \\ -753,382 \\ \hline 780,5319 \end{array}$$

Squares and cubes

Learner's Book pages 59–60

1. True or false? If false, explain why.

a) $\sqrt[3]{-27} = -\sqrt[3]{27}$

b) $\sqrt{-36} \neq -\sqrt{36}$

c) $6^2 + 4^2 = 10^2$

2. Simplify without the use of a calculator. Show all the steps.

a) $\sqrt{16} + \sqrt{121} \times \sqrt{4} - \sqrt{1}$

b) $7^2 + \sqrt[3]{-1}$

c) $\sqrt{24 + 1} + \sqrt{-10 + 19}$

d) $\sqrt[3]{0} + \sqrt[3]{-1\,000}$

e) $\sqrt{\sqrt{81}} - \sqrt[3]{-125}$

f) $(12^2 + 1^3) \div (-\sqrt{25})$

g) $\sqrt{100} \times 12 \div \sqrt{144}$

h) $\sqrt[4]{16} \div 0^2$

i) $\sqrt{23 + \sqrt[3]{8}} + (-9)^2$

j) $(-5)^3 \div (11^2 + (-2)^2)$

k) $\sqrt{16^2} + \sqrt[3]{64}$

l) $\sqrt[3]{216} - \sqrt[3]{-216} + (-6)^3$

m) $2(\sqrt{0}) \times \sqrt[3]{1\,000}$

n) $\sqrt{2^2} + \sqrt[3]{2^3} + \sqrt[4]{2^4} + \sqrt[5]{2^5}$

3. In each case, find the values of \square and \triangle to make the statement true.

a) $5^\square + \triangle^3 = 89$

b) $\square^{\sqrt{\square}} + \square = 20$ (Note: All the squares have the same value!)

Investigate and extend patterns

Learner's Book pages 74–77



Reminder

Patterns can be represented as number patterns, in tables, as flow diagrams and explained in words.

1. Extend the patterns on both sides with three terms.

a) ; ; ; -50; 0; 50; 150; 200; ; ;

b) ; ; ; -32; 16; -8; 4; ; ;

c) ; ; ; $\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$; ; ;

d) ; ; ; $3^4 \times 7^7$; $3^5 \times 7^6$; $3^6 \times 7^5$; $3^7 \times 7^4$; ; ;

2. The first two numbers of each number pattern are given. Create two different number patterns by writing out the next three numbers in each pattern. For each pattern, explain the rule.

Pattern 1: 1; 4; ; ;

Pattern 2: 1; 4; ; ;

Explanation:

Explanation:

3. The tables with number patterns in **a)** and **b)** work in pairs. Complete the tables in **a)**. These values will help you to complete the tables in **b)**.

a) i)	ii)	iii)	iv)
Position of term	Position of term	Position of term	Position of term
Value of term	Value of term	Value of term	Value of term
1	1	1	1
2	2	4	8
3	-15	9	27
4	-40	36	125
10		100	
n	$-5m$	a	q

b) i)	ii)	iii)	iv)
Position of term	Position of term	Position of term	Position of term
Value of term	Value of term	Value of term	Value of term
1	-3		2
2	-8	8	
3		18	28
	-38		126
10		200	1 001
n	m	a	q

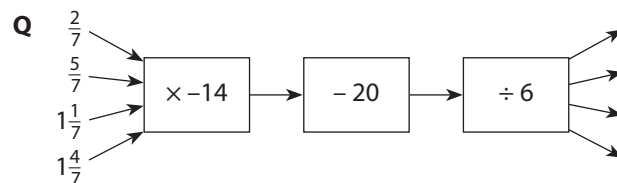
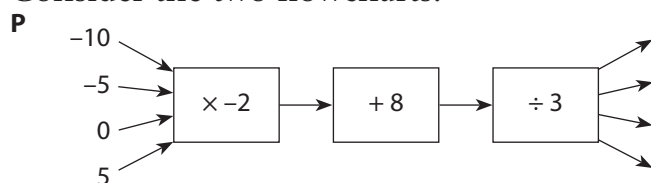
4. Match the number patterns in row 1 to the general rules in row 2.

Number pattern	a) 5; 25; 125; ...	b) -3; -11; -19; ...	c) -2; -8; -18; ...	d) -3; 1; 5; ...
General rule	i) $-2n^2$	ii) $4n - 7$	iii) 5^n	iv) $-8n + 5$

Input and output values

Learner's Book pages 326–334

4. Consider the two flowcharts.



a) Describe the pattern of the input values in words.

P:

Q:

b) Calculate the output values for flowcharts P and Q. Complete the tables.

P	Input				
	Output				

Q	Input				
	Output				

c) Why is each flowchart a representation of a function?

5. Two tables with output values are given.

a) Find the input values if the following rules were used.

Table M: square the input value and subtract 1.

Table N: subtract 1 from the input value and square the result.

M	Input					
	Output	80	48	24	8	0

N	Input					
	Output	64	36	16	4	0

b) True or false? $a^2 - 1 = (a - 1)^2$

6. Table Y can be used to calculate the areas of rectangles and Table Z can be used to calculate the perimeters of rectangles.

a) Complete both tables.

Y	l	90	1,2		8
	b		1,1	0,04	
	$A =$	3 600		0,028	6,4

Z	l		$\frac{9}{16}$	$12\frac{1}{4}$	$15\frac{2}{5}$
	b	$\frac{1}{5}$		$8\frac{1}{3}$	
	$P =$	$1\frac{3}{5}$	$1\frac{7}{8}$		$45\frac{1}{15}$

b) Why are there no negative values in the above two tables?

Algebraic language; conventions

Learner's Book pages 92–95

1. Explain what each rule means for the number sequence next to it.

	Rule	Number sequence	Explanation
a)	3^n	3; 9; 27; 81	
b)	$x + 4$	14; 15; 16; 17; ...	
c)	$-10m$	-40; -50; -60; -70; -80	



Tip

We use algebraic language to help us with patterns. Variables and constants make up algebraic language.

2. Sipho has a new password for his Internet banking. **47pqb3s20t**

- a) Underline all the variables. b) Circle all the constants.

3. Repeat the instructions above for the following two formulae:

a) $P = 2l + 2b$

b) $A = \frac{1}{2} \times b \times h$

4. One packet of sweets costs q rand. Fill in the missing values:

- a) Three packets will cost rand.

- b) packets will cost $15q$ rand.

- c) p packets will cost ran.



5. Charmaine is now c years old.

- a) Five years ago she was years old. b) years ago she was $c - b$ years old.

- c) In seven years' time, she will be years old.

6. Write in algebraic language.

- a) The sum of three times a certain number and 10.

- b) The number of hours in y days.

- c) The difference between the square of m and the cube root of n .

- d) The quotient if a certain number is divided by 17.

7. Consider the algebraic expression: $3y^2x - 5 + 2x \times 3y + 1y^3 \div a8$

- a) Rewrite and correct the expression according to mathematical conventions.

- b) How many terms are in the expression?

- c) Write down the constant term.

- d) Write down the cube root of the last term if $y = 2$ and $a = -1$.

Simplify algebraic expressions; squares and cubes

Learner's Book pages 121–125

1. Match each algebraic expression in Column A to the answer in Column B.

Column A ($x \neq 0$)		Column B	
a)	$\frac{x+3x}{x}$	i)	$-3x$
b)	$\frac{(x)(3x)}{x}$	ii)	$1+3x$
c)	$\frac{x+3x^2}{x}$	iii)	4
d)	$\frac{-x-3x}{x}$	iv)	$3x$
e)	$\frac{(x)(-3x)}{x}$	v)	-4

Answers	
a)	
b)	
c)	
d)	
e)	

2. Consider the two expressions below.

Expression A: $4p \times p(8p - 12)$

Expression B: $4p - p(8p - 12)$

- a) Write down the number of terms in each expression. A: B:
- b) Simplify each expression.

3. Fill in the missing values.

a) $(-8x^4y^5)^2 =$

b) $(\text{ })^3 = -27a^6b^{12}$

c) $-\sqrt[3]{125m^3n^0} =$

d) $\sqrt[3]{\text{ }} = -6x^4y^5$

e) $-\sqrt{\text{ }} \times \sqrt{121k^4}$

$= -12k^4 \times \text{ } =$

f) $\sqrt{\text{ }} = 7a^2b^4$

g) $\sqrt{9p^8 + \text{ }} = \sqrt{\text{ }} = 5p^4$

h) $\sqrt{\frac{100x^5}{x}} = \sqrt{\text{ }} =$

i) $\sqrt{\frac{36p^8}{q^{10}}} =$

j) $\frac{\sqrt{64y^{12}}}{\sqrt[3]{64y^{12}}} \div \frac{\text{ }}{\text{ }} =$



Reminder

Squaring and finding the square root are inverse operations.

$$(2ab)^2 = 4a^2b^2 \leftrightarrow \sqrt{4a^2b^2} = 2ab$$

Finding cube roots and cubing are inverse operations.

$$\sqrt[3]{x^3y^{15}} = xy^5 \leftrightarrow (xy^5)^3 = x^3y^{15}$$

Solve equations

Learner's Book pages 346–353

1. Solve for x in each of the equations.

a) $0,4x + 0,5(x + 2) = -2 - 0,1x$

b) $\frac{5}{6}x - 4 = \frac{2}{3}x$

c) Check each solution by substitution.

2. There are mistakes in the following calculations.
For each explain what is wrong and why it is wrong.

a) $4a - 5 = 35$

$$4a = 40$$

$$\therefore a = -10$$

b) $7b = 11$

$$\therefore b = \frac{7}{11}$$

c) $-2c - 10 = 50$

$$2c = 40$$

$$\therefore c = 20$$

Calculations:



Tip

Remember to work with the left hand side and the right hand side of the equal sign separately.

3. Solve for y and match each solution to ONE of the following.

$$\{(-1)^{10}; (-1)^{11}; \sqrt{7\frac{9}{16}}; \sqrt{\frac{16}{121}}; \sqrt[3]{27}; \sqrt[3]{-27}; y \in \mathbb{R}; y \notin \mathbb{R}\}$$

a) $-3 + (2y + 1)2 = 10$

b) $-3(y + 5) = 2y$

c) $5(y - 1) = -3 - (y + 8)$

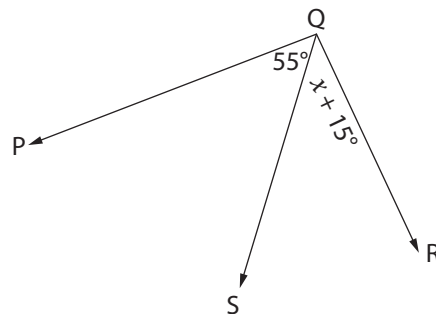
d) $\frac{1}{2}(2y + 10) = \frac{1}{3}(3y - 30)$

4. Ms Fourie bought almonds and cashew nuts to sell in small packets. Almonds cost R180 per kilogram and cashew nuts cost R200 per kilogram. Ms Fourie used 10 kg more almonds than cashew nuts. How many kilograms of almonds did she buy if the total cost was R9 400? (Hint: Let x be the number of kilograms of cashew nuts.)

Perpendicular and intersecting lines

Learner's Book pages 183–190

1. $\angle PQR$ is a quarter of a revolution. Find the value of x .

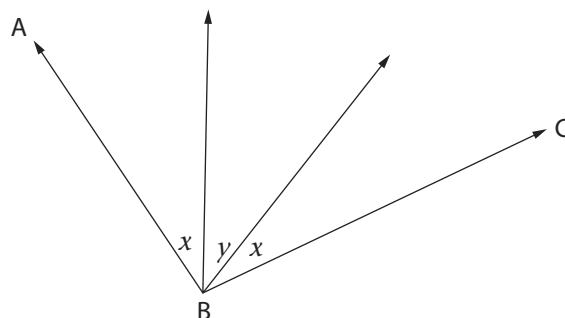


2. If AB is perpendicular to BC in the image alongside, state in each case whether the following statements are true or false:

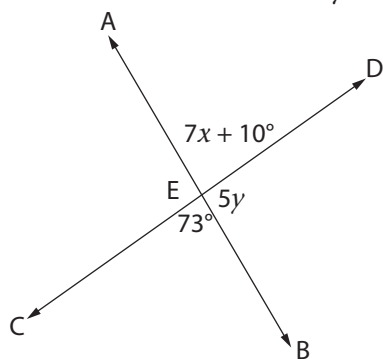
a) $2x$ is the complement of y

b) $x = 22^\circ$ and y is half of a right angle

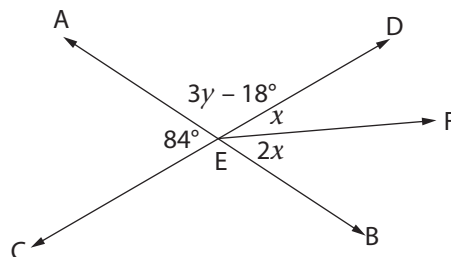
c) $x = 20^\circ$ and $y = 2x + 10^\circ$



3. Find the values of x and y .



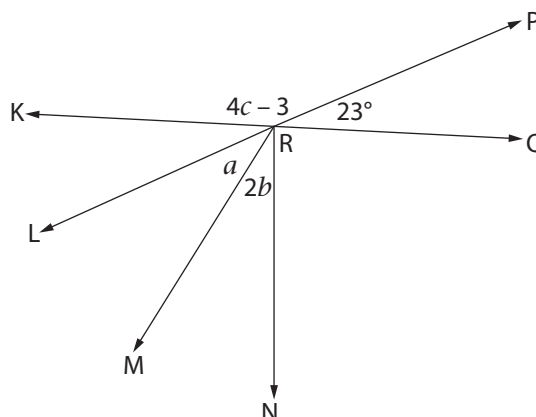
4. Find the values of x and y .



5. KQ and LP are straight lines. LR is the bisector of $\angle KRM$ and $QR \perp RN$.

a) Find the values of a and b .

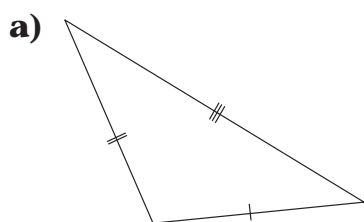
b) Find the value for c in three different ways.



Classify triangles

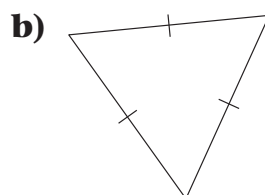
Learner's Book pages 161–167

1. Classify the following triangles according to their angles and their sides. The first one has been done for you.



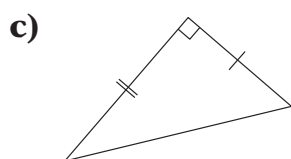
Angles: obtuse angled triangle

Sides: scalene triangle



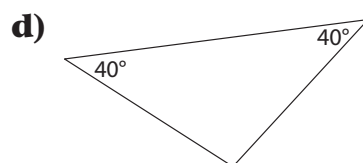
Angles:

Sides:



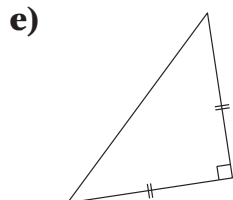
Angles:

Sides:



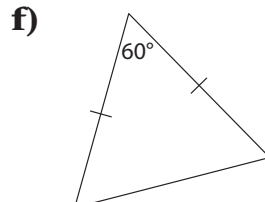
Angles:

Sides:



Angles:

Sides:



Angles:

Sides:

2. Match the description in Column A to the given angles or sides in Column B.

Column A		Column B	
a)	acute-angled triangle	i)	angles: 20° ; 70° ; 90°
b)	equilateral triangle	ii)	sides: 4 cm; 7 cm; 70 mm
c)	obtuse-angled triangle	iii)	angles: 70° ; 30° ; 80°
d)	not a triangle	iv)	sides: 6 cm, 70 mm, 8 cm
e)	scalene triangle	v)	angles: 10° ; 140° ; 30°
f)	isosceles triangle	vi)	sides: 6 cm; 1 cm; 7 cm
g)	right-angled triangle	vii)	angles: 60° ; 60° ; 60°

Answers	
a)	
b)	
c)	
d)	
e)	
f)	
g)	

3. a) True or false: it is impossible to construct an equilateral right-angled triangle.

b) Explain your answer.

Transform points on the Cartesian Plane

Learner's Book pages 388–392



Reminder

When we translate we slide the figure or point across the Cartesian plane.
When we rotate we turn the figure or point around the origin of the Cartesian plane.
When we reflect we flip the point or figure about the given axis or line indicated.

1. Transform the given point. Fill in the coordinates after each step.

a) Write down the coordinates of point P.

b) Reflect P in the x -axis and label the image

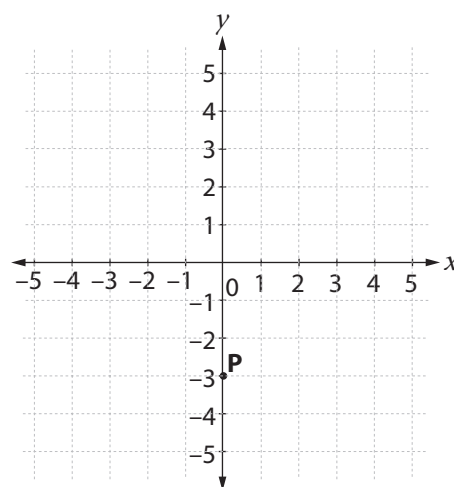
Q(;).

c) Rotate Q ninety degrees around the origin in an anti-clockwise direction and label the image

R(;).

d) Translate R four units down and two units left.

Label the image S(;).



2. Transform the given point. Fill in the coordinates after each step.

a) Write down the coordinates of point A.

b) Reflect A in the y -axis and label the image

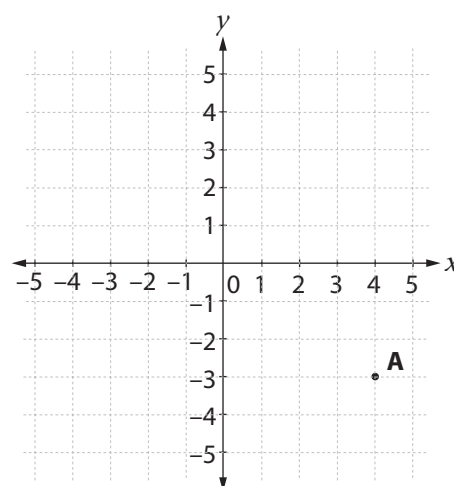
B(;).

c) Translate B one unit right and six units up. Label the image C(;).

d) Rotate C ninety degrees around the origin in a clockwise direction and label the image D(;).

e) Translate D three units down and two units to the right.

Label the image E(;).



Using Pythagoras to solve triangles

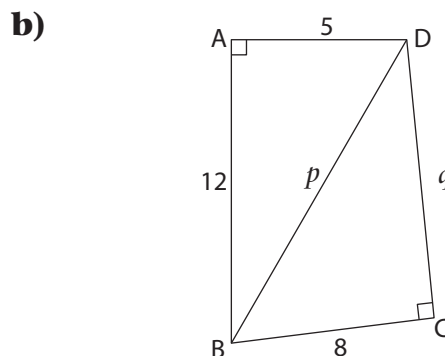
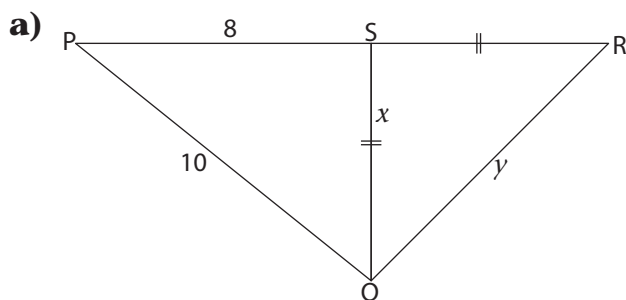
Learner's Book pages 252–255



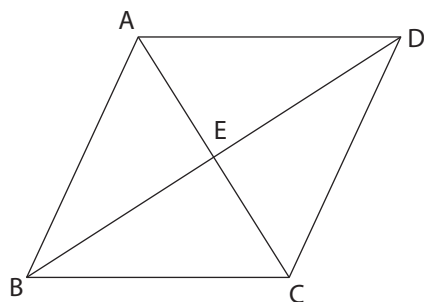
Reminder

Always begin your answer by writing down the theorem and the reason, between brackets. For example, if $\angle A = 90^\circ$ in $\triangle ABC$, then: $a^2 = b^2 + c^2$ (Pyth).

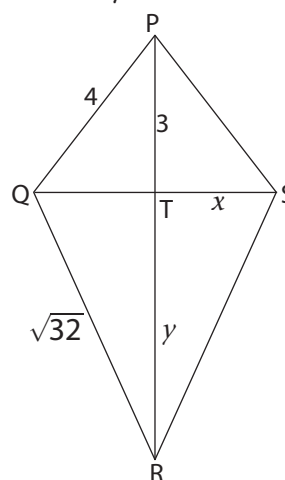
1. Calculate the lengths of the unknown sides.
(All measurements are in cm.) Show all calculations.
Leave your answers in surd form if necessary.



2. ABCD is a rhombus. Find (with reasons) the length of AB if $AC = 18$ cm and $BD = 24$ cm.



3. PQRS is a kite. Find (with reasons) the values of x and y .



Simple examples of area and perimeter

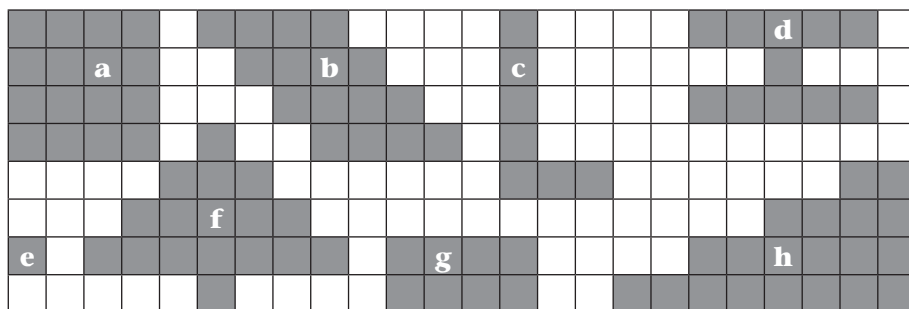
Learner's Book pages 259–265



Reminder

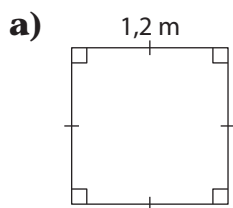
Perimeter is the distance around a shape.
Area is the amount of space the shape covers.

1. Each small square represents $1 \text{ cm} \times 1 \text{ cm} = 1 \text{ cm}^2$.
Find the area and the perimeter of each shape.
Remember to include the correct units in each answer.

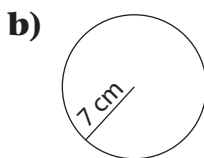


	a	b	c	d	e	f	g	h
Area								
Perimeter								

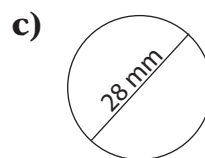
2. Calculate the areas and perimeters (or circumferences) of the given shapes. Write the correct formula in the first line of each answer.



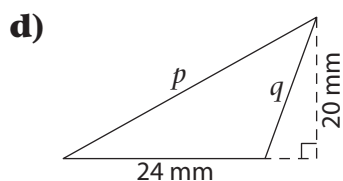
Area =
 =
 = m^2
 Perimeter =
 =
 = m



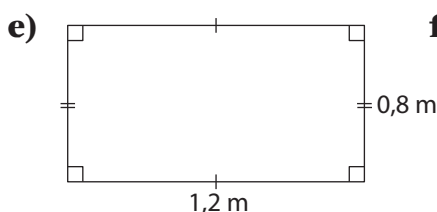
Area =
 =
 = cm^2
 Circumference =
 =
 = cm



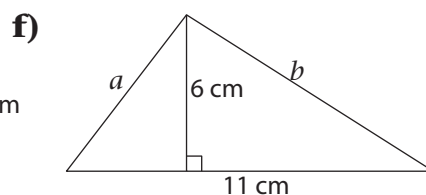
Area =
 =
 = mm^2
 Circumference =
 =
 = mm



Area =
 Perimeter =
 (in terms of p and q)



Area =
 Perimeter =



Area =
 Perimeter =
 (in terms of a and b)

How to develop rubric and checklist assessment tools

Rubrics

A rubric is a tool teachers use to assess a learner's performance on a specific task. It is presented in the form of a grid that clearly outlines the criteria used for assessment as well as different levels of performance per criterion.

Benefits of using a rubric

- A rubric helps learners to understand objectives. Developing rubrics with your learners will help them to understand the purpose and content and help them to prepare for the assessment.
- A rubric has a clear and standardised approach to assessment, which ensures that learners are assessed consistently and fairly.
- A rubric allows teachers to provide specific feedback to learners, highlighting areas of strength and areas for improvement.
- A rubric helps learners get a clear idea on how to improve their performance after assessment.
- A rubric allows learners to self-improve. Encourage learners to use the rubric before they hand in their work.
- A rubric is easy to use and can be easily adapted to meet changing needs.

Steps to creating a rubric

Step 1: Clearly define the purpose of the assessment.

Use the assessment guidelines in the curriculum documents to determine what task/assignment the learners are required to complete.

Step 2: Define the criteria.

Use the objectives in the curriculum documents to consider what skills, knowledge or behaviours the assessment will evaluate.

Make sure that:

- criteria can be observed and measured
- criteria are important to the task at hand
- each criteria assesses a single aspect of the task.

Each criteria contains levels of performance. When creating these, consider:

- what will constitute outstanding achievement
- how will you define moderate or adequate achievement
- how would you define work that falls below expectations.

Ask yourself: Are there key criteria points that should carry a greater weight than others?

Step 3: Design a rating scale that clearly defines the levels of performance.

Check your mark allocation to ensure that your rubric falls in line with curriculum expectations.

Make sure you use language and terminology that the learner is familiar with so that they have a clear understanding of what is required of them.

Provide a scale of achievement that can assess the learners' overall competency in completing the task. For example, you can provide an overall mark according to the seven-point rating code or scale of achievement:

Rating code	Description of Competence	Percentage
7	Outstanding achievement	80–100
6	Meritorious achievement	70–79
5	Substantial achievement	60–69
4	Adequate achievement	50–59
3	Moderate achievement	40–49
2	Elementary achievement	30–39
1	Not achieved	0–29

Step 4: Write descriptions of expected performance at each level of the rating scale.

Describe observable and measurable behaviour and use parallel language across the scale. Indicate the degree to which the standards are met. Ensure that learners understand the expectations before and during the assessment.

Step 5: Create the rubric.

For ease of use, keep it to one page. Ask your colleagues for feedback and consider testing it before you use it for assessment. After you use the rubric, consider how effective it was and make any necessary revisions.

Checklists

A checklist is a simple assessment tool that provides a list of items or criteria to be checked off. It differs from a rubric in that it provides learners with the criteria of the requirements of an assignment rather than a means of assessing acquired knowledge. A checklist can be used solely by you as a teacher, or you can give your learners a checklist that they can refer to in order to make sure that they have included the required components for a task.

Checklists usually consist of a number of statements that refer to specific criteria and where the answer will be, for example, “Yes” or “No”, or “Achieved”, “Not yet” or “Almost”.

Benefits of using a checklist

- A checklist ensures that all relevant criteria are assessed and evaluated.
- A checklist helps to ensure consistent assessment of specified criteria.
- A checklist can be used by learners as a self-assessment tool.
- A checklist identifies learning needs in a clear and simple way.
- A checklist is easy to create and use and provides an uncomplicated guide for assessment.

Steps to create a checklist

Step 1: Define the purpose and what you want to assess.

This could be specific skills or a general assessment.

Step 2: Identify the criteria.

What specific elements or content will be assessed?

Step 3: Create your checklist.

Check that it contains everything you want to assess.

Exemplar:

Planning a questionnaire

Planning a questionnaire checklist			
Did the learner:	Yes 2	Partially 1	No 0
specify the topic and purpose of the project?			
identify the population that he/she chose?			
identify the sample that he/she chose?			
explain how he/she chose that particular sample?			
make a credible attempt to choose a sample that fairly represented the whole population?			
plan a coherent, well thought-out questionnaire?			
Total	____ / 12		

Intervention strategies

Baseline assessment and intervention strategies

Some learners may experience academic backlogs for various reasons, including the impact on learning due to the COVID-19 pandemic, underlying learning barriers or special education needs such as visual or hearing impairments or intellectual barriers. Baseline assessment will help you identify learners that may be experiencing these barriers.

Analysing baseline assessment questions will provide insight into learners' current knowledge and skills regarding certain topics, as well as their preparedness for the work ahead. The results of baseline assessments can help to identify the areas where learners require support and/or intervention.

Learners may require support and/or intervention for the following reasons:

- barriers to learning
- class size
- reading comprehension (the ability to understand what they have read).

Barriers to learning

Some learners may face barriers to learning. It is important to accommodate learners with barriers to learning to ensure that our classrooms remain inclusive. These learners may require and should be granted more time for completing tasks, acquiring thinking skills (own strategies), and completing assessment activities. Adapt the number of activities to be completed without interfering with learners gaining the required skills. Learners experiencing barriers to learning can also be paired with others who may be able to support them.

Class size

- Peer tutoring can be an effective intervention method when class size is problematic.
- Quieter learners often struggle in a large class, as they tend not to ask questions. Organising learners into groups or pairs can help to create a more inclusive and enabling learning environment.
- Ensure that groups are made up of learners with varying ability, so that learners who may be struggling are supported by their peers.
- Peer assessment can also be used successfully during informal assessment and allows you to gauge learners' understanding in a less intimidating manner than a formal test or assignment.
- The following strategies can be used in a large class:
 - *Thumbs up/thumbs down*: Check understanding by a show of thumbs. Thumbs up indicate that learners have understood; thumbs down show that they have not understood; thumbs sideways could show that they are not sure.
 - *Response boards*: These are small chalkboards or whiteboards where learners record their response to a question. When you say "Show your answers" they all hold up the board. This way you can quickly see who is struggling.
 - *Show fingers 1-2-3*: Ask learners to show fingers to indicate if they understand activity instructions before working in a group. 1 = I do not understand; 2 = I sort of understand but I need some help; 3 = I understand completely.

Reading comprehension

- Support learners by giving them pre-reading questions and post-reading strategies to organise what they have learnt. Pre-reading questions could include asking the learners what they already know about the topic. Teach learners to summarise the content into bullet points and make use of mind maps. This requires the learners to rewrite the content in their own words.
- Write difficult terminology on the board and give simple explanations.
- Diagrams can be very useful to explain concepts in a way that learners can visualise the situation.

General teaching intervention strategies

Teach from the learner's point of view

- Put yourself in the learner's position: If you were the learner, what would you like the teacher to explain or show you that you could not learn previously?
- Remember that learners might still have emotional issues related to the COVID-19 pandemic, which you may need to address.

Reteach topic(s) for which learners achieved low scores (closing the gap)

- Focus on concepts, and not only on factual content. Then use illustrations to support learners' understanding and avoid superficial rote learning. The more "real-life" examples used, the easier it will be for the learners to conceptualise the topic.
- Make the structure of your lessons and teaching materials clear: State specific, achievable goals, provide graphic organisers to link parts of the lesson and give frequent summaries of sections of the lesson. A graphic organiser can be any visual representation of content that gives an immediate overview of main points.
- Refer frequently to your progress in terms of the lesson structure. This will help learners to develop an overall and cohesive (holistic) grasp of the content.
- Skills, knowledge and concepts run like threads through the previous grades. Explain these threads to learners, as you begin teaching a new topic or module – it will help learners to link the new content to what they already know.

Metacognition

Metacognition is the ability to understand our own thought processes. It is essential that metacognition takes place during lessons.

Learners retain information best when they can visualise situations. Visual aids, such as flash cards and mind maps, and practical work can aid with developing metacognition, or getting learners to think about and understand their own thought processes. After completing practical tasks, give learners sentence starters to complete. For example: I learnt . . . ; I wonder . . . ; I still want to know . . . ; I still don't understand . . . ; I still have a question about . . .

Retaining information

- Flash cards and mind maps can be useful tools to help learners memorise facts.
- Encourage learners to break down content into more manageable sections. They can then create a mind map for each sub-topic. Tables can also help learners summarise content into more manageable sections.
- A mnemonic is a word, sentence or poem that helps you remember something. Mnemonics help learners to memorise content. Use the first letter of each word to create a sentence that the learners can memorise easily. For example, a mnemonic such as “**Eat An Apple As A Nice Snack**” can help learners to memorise the names of the continents: **E**urope, **A**sia, **A**frica, **A**ustralia, **A**ntarctica, **N**orth America, **S**outh America.

Develop presentation skills

Many learners find it challenging to speak in front of the class, but this improves with practice. Encourage learners to answer questions in class and take part in class discussions by using one or more of the following strategies:

- *Use the think-pair-share method:* Posing a question and giving learners a short time to think about it, followed by discussion with a partner and then sharing with others. Learners who are shy will find it easier to share ideas with a partner first.
- *Tell-check-say:* A learner tells the answer to a friend, together they check if the answer is correct by referring to the textbook, and then the first learner says the answer out loud to the class or writes it down.
- *Target basic and then more advanced questions to specific learners based on their readiness to answer them:* A good strategy is to first ask the question to the whole class. This ensures that everyone thinks about it. Then, ask a specific learner the question.
- *Keywords on cards:* These can be used to help the learner remember their presentation. Eye contact is essential, so emphasise to learners that they should not read their presentation.

Interventions for learners with special education needs


- Special educational needs may include visual or hearing impairments or intellectual barriers. Do not form an opinion about a learner too early. This could lead to an inaccurate assessment of a learner’s barrier, or an inaccurate assessment of the existence of a barrier (when in fact there may not be one). If the barrier is obvious after the first term and becomes a serious obstacle to the learner, seek professional help from the district office.
- Immediate steps could include: observing the learner inside and outside of the classroom, contacting the learner’s previous teachers and consulting learner progress reports to understand their needs.

Selected answers

Page 8

1. a) 42 b) 12 c) 11 d) 7 e) 132 f) 32 g) 40 h) 1 i) 3
j) undefined k) 1 l) 0
2. a) < b) > c) < 3. a) True b) False. 2 is a prime number.
c) True d) False $27 - 50 = -23$ 4. a) + b) \times c) +; + d) \times ;
 \times e) +; \times f) \times ; -; \times ; \times 5. 67; 61; 59; 53; 47; 43; 41
6. Moira: $7(12 - 9) = 7 \times 12 - 7 \times 9 = 84 - 63 = 21$
Jabu: $2 \times 12 \times 8 = (2 \times 12) \times 8 = 24 \times 8 = 192$

Page 9

1. a) -4; 15; 0; -11; $\frac{12}{2}$; -3,0
b) 
2. a) > b) < c) < d) > 3. a) -14°C b) 12°C
c) -14°C ; -11°C ; -8°C ; -6°C ; -5°C ; -2°C d) 12°C ; 10°C ; 8°C ; 4°C ; 1°C
4. a) 8 b) -8 c) -1 d) -4 5. a) -9; -4; 1; 6; 16
b) -1; -2; 1; 0; 3 c) -8; -12; -11; -14; -18

Page 10

1. 10; 12; 40; 30; 6; 30
2. a) $\frac{35}{8}$ b) $-\frac{57}{10}$ c) $-\frac{62}{3}$ d) $-\frac{75}{6}$ e) $\frac{63}{4}$ f) $\frac{39}{4}$
3. a) $\frac{9}{3}$ b) $-\frac{216}{21}$ c) $\frac{229}{30}$ d) $-\frac{47}{20}$ e) $\frac{7a}{11}$ f) $\frac{4}{b}$
4. $\frac{1}{3}$

Page 11

1. Top line: 0,05; 15%; 0,25; $\frac{4}{10}$; 0,5; 0,63; $\frac{3}{4}$; 91%
Bottom line: 0,125; 0,29; $\frac{39}{100}$; 53%; 0,68; 0,85; 0,94
2. a) 2 decimals: 5,31; 5,13; 5,08; 5,32; 5,25; 5,23
Descending: 5,32; 5,31; 5,25; 5,23; 5,13; 5,08
b) 3 decimals: -12,385; -11,892; 12,010; -11,537; -12,002; -12,000
Ascending: -12,385; -12,010; -12,002; -12,000; -11,892; -11,537
3. a) 1,491 b) -751,403 c) 1 893,6003

Page 12

1. a) True b) True c) False: $36 + 16 \neq 100$
2. a) 25 b) 48 c) 8 d) -10 e) 8 f) -29 g) 10 h) undefined
i) 86 j) -1 k) 20 l) -204 m) 0 n) 8
3. a) $\square = 2$; $\triangle = 4$ b) $\square = 4$

Page 13

1. a) -200; -150; -100; ...; 250; 300; 350
b) 256; -128; 64; ...; -2; 1; $-\frac{1}{2}$ c) $\frac{1}{2}$; $\frac{2}{3}$; $\frac{3}{4}$; ...; $\frac{7}{8}$; $\frac{8}{9}$; $\frac{9}{10}$
d) $3^1 \times 7^{10}$; $3^2 \times 7^9$; $3^3 \times 7^8$; ...; $3^8 \times 7^3$; $3^9 \times 7^2$; $3^{10} \times 7^1$
2. e.g. 1; 4; 7; 10; 13 or 1; 4; 16; 64; 256 or 1; 4; 9; 16; 25 or 1; 4; 1; -4; 1 etc.
3. a) i) 12; 30; $3n$ ii) 8; -5; -10; -50 iii) 2; 6; a^2 iv) 1; 1 000; q^3
b) i) 4; 29; $3n - 1$ ii) -13; -48; $-5m + 2$ iii) 2; 72; $2a^2$ iv) 10; 9; $q^3 + 1$
4. a) iii b) iv c) i d) ii

Page 14

1. a) P: multiples of 5 from -10 to 5; Q: begin with $\frac{2}{7}$ and add $\frac{3}{7}$ for three more terms
b) P Input: -10; -5; 0; 5; Output: $9\frac{1}{3}$; 6; $2\frac{2}{3}$; $-\frac{2}{3}$; Q Input: $\frac{2}{7}$; $\frac{5}{7}$; $1\frac{1}{7}$; $1\frac{4}{7}$; Output: -4; -5; -6; -7
c) Each input value has only one output value.
2. a) M Input: +9; +7; +5; +3; +1; N Input: +9; +7; +5; +3; +1
b) False
3. a) Y: 0,7; 40; 0,8; 1,32 Z: $\frac{3}{5}$; $\frac{3}{8}$; $7\frac{2}{15}$; $41\frac{1}{6}$
b) A rectangle cannot have a negative length or breadth.

Page 15

1. a) $n \in \{1; 2; 3; 4\}$ b) $x \in \{10; 11; 12; 13; \dots\}$ c) $m \in \{4; 5; 6; 7; 8\}$
2. $\textcircled{4} \textcircled{7} p \textcircled{q} \textcircled{b} \textcircled{3} \leq \textcircled{2} \textcircled{0} \textcircled{t}$ 3. a) $P = \textcircled{2}l + \textcircled{2}b$ b) $A = (\frac{1}{2}) \times b \times h$
4. a) $3q$ b) 15 c) pq 5. a) $c - 5$ b) b c) $c + 7$
6. a) $3x + 10$ b) $24y$ hours c) $m^2 - \sqrt[3]{n}$ d) $\frac{x}{17}$
7. a) $3xy^2 - 5 + 6xy + \frac{y^3}{8a}$ b) 4 c) -5 d) -1

Page 16

1. a) iii) b) iv) c) ii) d) v)
2. a) A: 1; B: 2 b) A: $32p^3 - 48p^2$; B: $16p - 8p^2$ 3. a) $64x^8y^{10}$
b) $(-3a^2b^4)^3$ c) $-5m$ d) $\sqrt[3]{-216x^{12}y^{15}}$
e) $-\sqrt{144k^8} \times \sqrt{121k^4} = -12k^4 \times 11k^2 = -132k^6$ f) $\sqrt{49a^4b^8}$
g) $\sqrt{9p^8 + 16p^8} = \sqrt{25p^8} = 5p^4$ h) $10x^2$ i) $\frac{6p^4}{q^5}$ j) $\frac{8y^6}{4y^4} = 2y^2$

Page 17

1. a) -3 b) 24 c) a) LHS = $0,4 \times -3 + 0,5(-3 + 2) = 1,7$
RHS = $-2 - 0,1 \times -3 = 1,7$ b) LHS = $\frac{5}{6} \times 24 - 4 = 16$ RHS = $\frac{2}{3} \times 24 = 16$
2. a) $a = 10$ b) $b = \frac{11}{7}$ c) $c = -30$
3. a) $y = \frac{11}{4} = 2\frac{3}{4} = \sqrt[7]{\frac{9}{16}}$ b) $y = -3 = \sqrt[3]{-27}$ c) $y = -1 = (-1)^{11}$ d) $y \notin \mathbb{R}$
4. 30 kg almonds

Page 18

1. $x = 20^\circ$ (rt angle = 90°) 2. a) True b) False c) True
3. $x = 9^\circ$ (vert opp angles); $y = 21,4^\circ$ (str line) 4. $x = 28^\circ$ (vert opp angles)
 $y = 38^\circ$ (str line) 5. a) $a = 23^\circ$ (LR bisector; vert opp angles); $b = 22^\circ$ (str line)
b) $c = 40^\circ$ (str line OR vert opp angles OR revolution)

Page 19

1. a) obtuse angled; scalene b) acute angled; equilateral c) right angled;
scalene d) obtuse angled; isosceles e) right angled; isosceles f) acute
2. a) iii) b) vii) c) v) d) vi) e) iv) f) ii) g) i)
3. a) True b) A right angled triangle has one angle of 90° , but an
equilateral triangle has three angles of 60° each.

Page 20

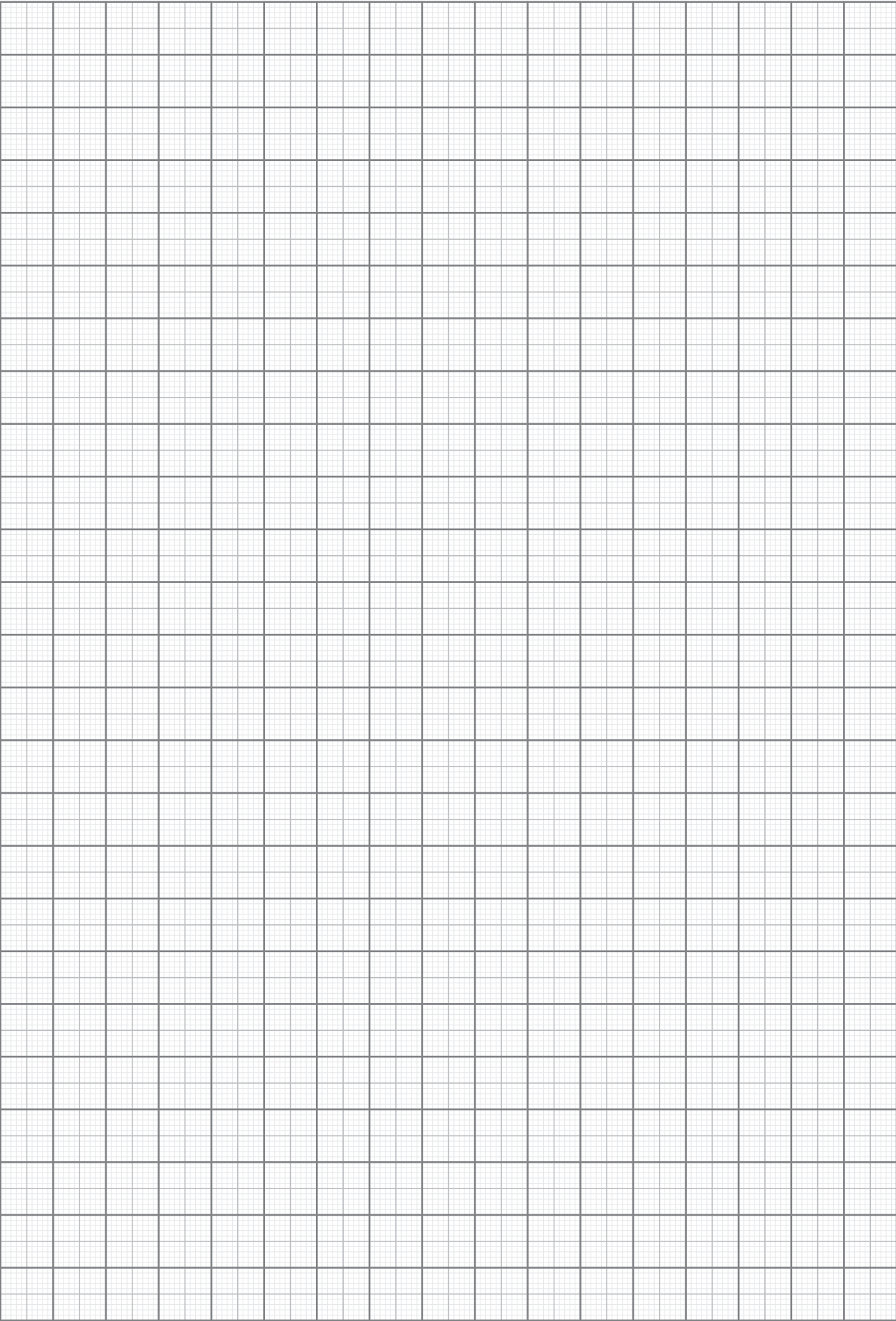
1. a) P(0; -3) b) Q(0; 3) c) R(-3; 0) d) S(-5; -4) 2. a) A(4; -3) b) B(-4;
-3) c) C(-3; 3) d) D(3; 3) e) E(5; 0)

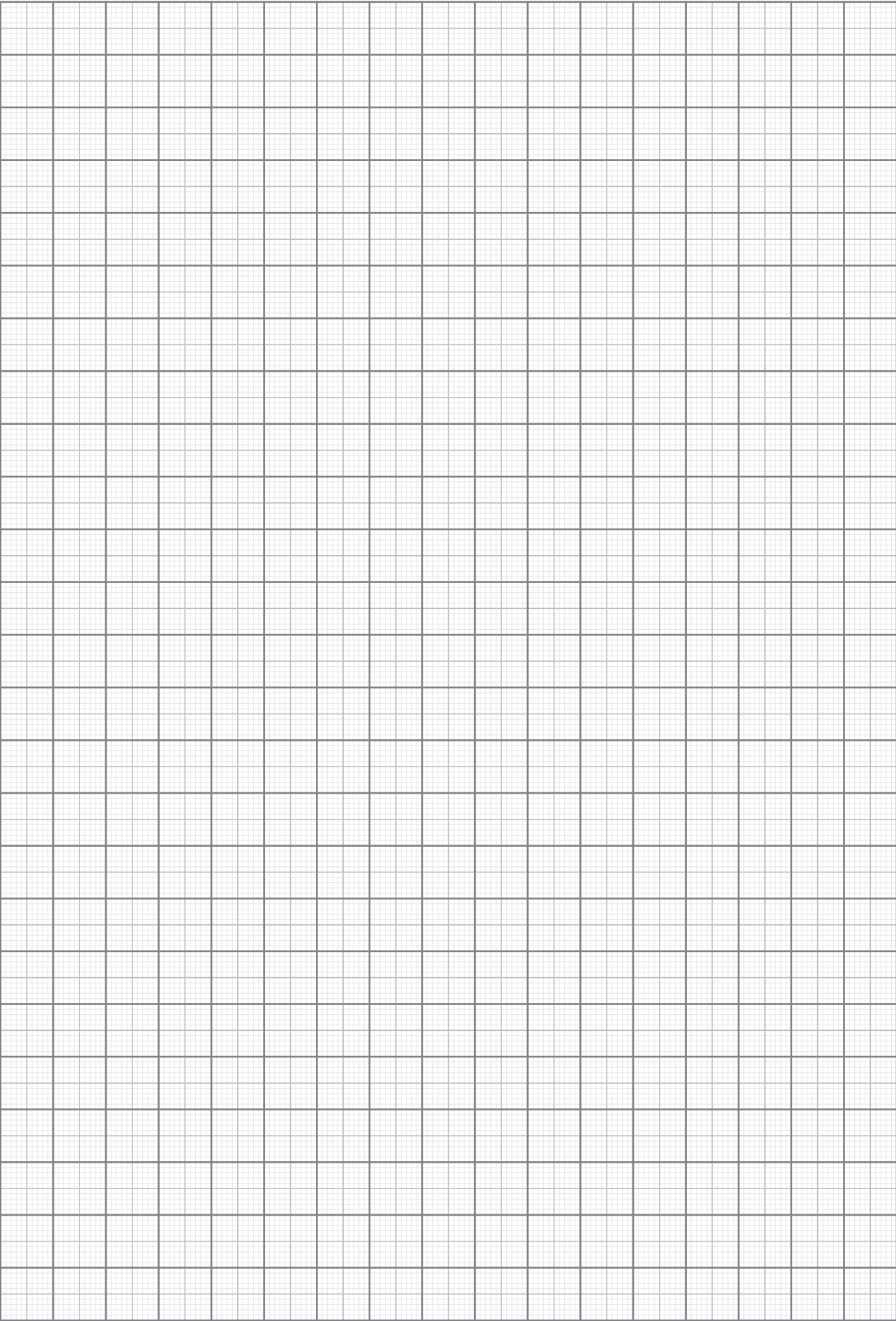
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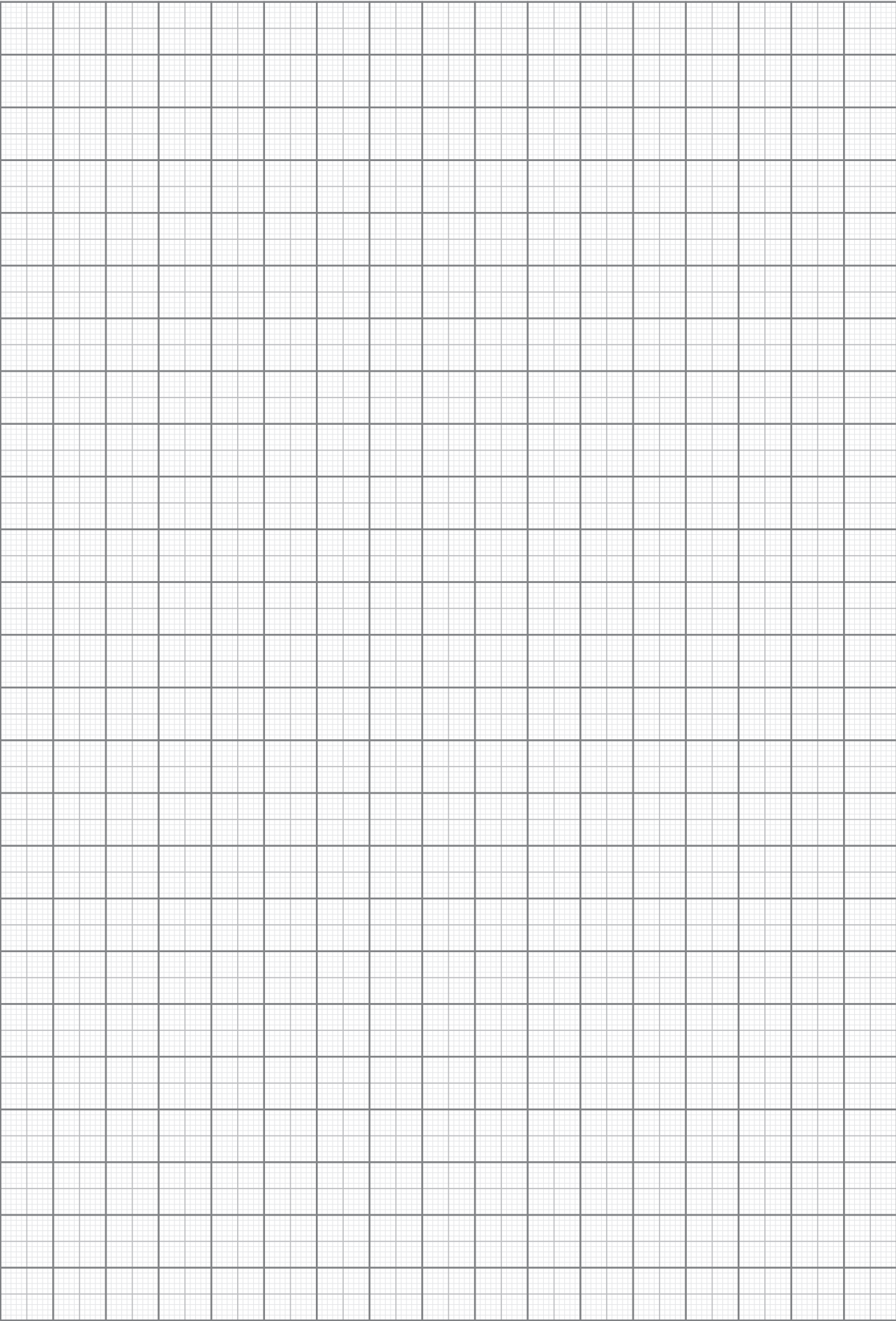
1. a) $x = 6$ cm; $y = \sqrt{72}$ cm b) $p = 13$ cm; $q = \sqrt{105}$ cm
2. AB = 15 cm 3. $x = \sqrt{7}$ cm; $y = 5$ cm

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1. Area: 16 cm^2 ; 16 cm^2 ; 7 cm^2 ; 11 cm^2 ; 1 cm^2 ; 17 cm^2 ; 8 cm^2 ; 20 cm^2
Perimeter: 16 cm; 22 cm; 16 cm; 24 cm; 4 cm; 24 cm; 12 cm; 24 cm
2. a) A = 1,44 m²; P = 4,8 m b) A = 154 cm²; C = 44 cm
c) A = 616 mm²; C = 88 mm d) A = 240 mm²; P = $(24 + p + q)$ mm
e) A = 0,96 m²; P = 4 m f) A = 33 cm²; P = $(11 + a + b)$ cm







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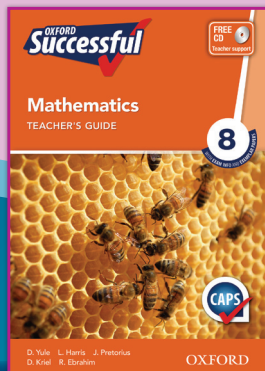
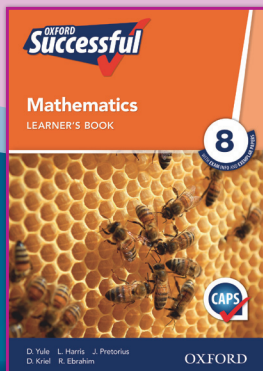
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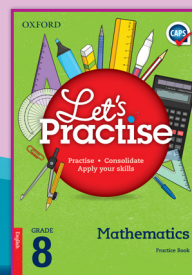
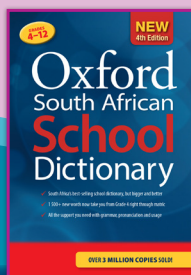
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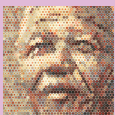
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