MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
31	50 minutes	3

Name: ..... Class: .....

Date: .....

MARK ____ / 31

INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions in this question paper.
2. Answer QUESTION 1 by **circling** the letter (A–D) in the answer grid at the end of that section.
3. Show **ALL** calculations clearly.
4. Show all units where applicable.
5. Number the answers correctly according to the numbering system used in this question paper.
6. A non-programmable calculator may be used, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1 [10 MARKS]

Four options are given as possible answers to the following questions. Choose the correct answer and circle the letter (A–D) in the grid at the end of this section. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1 Two shapes that have the same shape AND the same size are ... (1)

A) congruent ✓ **B)** equal in area only

C) symmetrical **D)** similar

Answer: A — Congruent shapes match exactly.

- **B** — equal areas do not force the same shape
- **C** — symmetry is a property of one shape
- **D** — similar shapes have the same shape but may differ in size

1.2 Two shapes that have the same shape but DIFFERENT sizes are ... (1)

A) equal **B) similar ✓**

C) identical **D)** congruent

Answer: B — Similar shapes are enlargements or reductions of each other.

- **A** — equal means the same in every way, which is congruent
- **C** — identical means exactly the same, which is congruent
- **D** — congruent shapes are the same size too

1.3 In similar triangles, the corresponding ANGLES are ... (1)

A) equal ✓ **B)** doubled

C) in the same ratio as the sides **D)** halved

Answer: A — Similar means the same shape, and shape is fixed by the angles.

- **B** — enlarging does not change angles
- **C** — only the SIDES are in a ratio
- **D** — enlarging does not change angles

1.4 △ABC ||| △DEF with AB = 6 cm and DE = 3 cm. The scale factor from △DEF to △ABC is ... (1)

A) 18 **B)** **2 ✓**

C) 3 **D)** 0,5

> **Answer: B** — 6 ÷ 3 = 2.
> - **A** — multiplied the two sides
> - **C** — used the smaller side alone
> - **D** — that is the factor the OTHER way round

1.5 For those triangles, if EF = 5 cm then BC is ... (1)

A) 15 cm **B)** 2,5 cm

C) **10 cm ✓** **D)** 5 cm

> **Answer: C** — Multiply by the scale factor 2.
> - **A** — used a factor of 3
> - **B** — divided instead of multiplying
> - **D** — similar triangles do not have equal sides unless the factor is 1

1.6 If the scale factor of an enlargement is 3, the AREA is multiplied by ... (1)

A) 27 **B)** 6

C) **9 ✓** **D)** 3

> **Answer: C** — Area scales by the SQUARE of the length factor.
> - **A** — that is the VOLUME factor
> - **B** — that is 3 doubled
> - **D** — that is the LENGTH factor

1.7 Triangle ABC is reflected in a line to give triangle A′B′C′. The two triangles are ... (1)

A) similar but not congruent **B)** neither similar nor congruent

C) congruent only if ABC is isosceles **D)** **congruent ✓**

> **Answer: D** — A reflection keeps every length and every angle, so the image is congruent to the original.
> - **A** — a reflection does not change the size, so the sides are EQUAL — that makes them congruent (and similar too)
> - **B** — a reflection keeps every length and angle
> - **C** — every reflected triangle is congruent to the original, isosceles or not

1.8 △ABC ≡ △PQR. The side equal to AC is ... (1)

A) **PR ✓** **B)** AB

C) QR **D)** PQ

> **Answer: A** — The letters correspond in order: A↔P, B↔Q, C↔R.
> - **B** — AB is in the first triangle
> - **C** — QR matches BC
> - **D** — PQ matches AB

1.9 A photograph 6 cm by 4 cm is enlarged so that the longer side becomes 15 cm. The shorter side becomes ... (1)

A) 12 cm
B) 10 cm ✓
C) 9 cm
D) 13 cm

> **Answer: B** — The factor is $15 \div 6 = 2{,}5$, and $4 \times 2{,}5 = 10$ cm.
> - **A** — used a factor of 3
> - **C** — used a factor of 2,25
> - **D** — ADDED 9 cm to both sides instead of scaling

1.10 Which one of the following is ALWAYS true? (1)

A) all triangles are similar
B) similar shapes are congruent
C) all rectangles are similar
D) congruent shapes are similar ✓

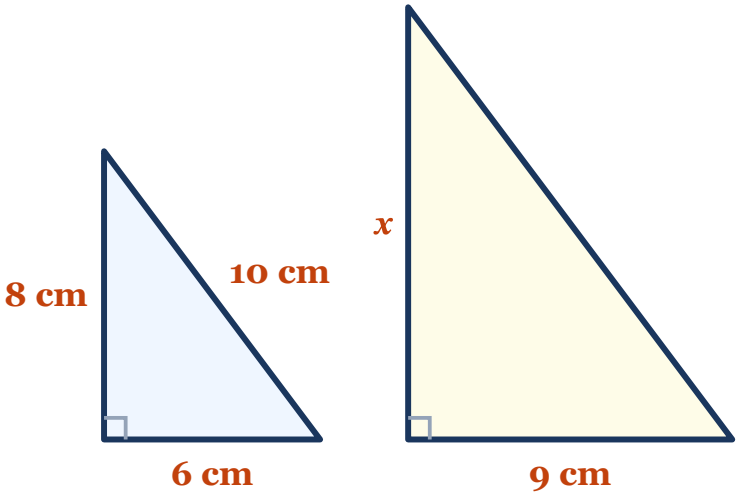
> **Answer: D** — Congruent shapes are the same shape, with a scale factor of 1.
> - **A** — triangles can have different angles
> - **B** — similar shapes may be different sizes
> - **C** — a 2×3 and a 2×5 rectangle are not similar

ANSWER GRID — MARKING GUIDELINE

1.1	(A)	B	C	D
1.2	A	(B)	C	D
1.3	(A)	B	C	D
1.4	A	(B)	C	D
1.5	A	B	(C)	D
1.6	A	B	(C)	D
1.7	A	B	C	(D)
1.8	(A)	B	C	D
1.9	A	(B)	C	D
1.10	A	B	C	(D)

QUESTION 2 [14 MARKS]

The two right-angled triangles below are similar. *The diagrams are not drawn to scale.*



2.1 Calculate the scale factor from the smaller triangle to the larger one. **(3)**

$k = \frac{9}{6}$ *(2)*
$= \mathbf{1{,}5}$ *(1)*

2.2 Hence calculate the length of x. **(3)**

$x = 8 \times 1{,}5$ *(2)*
$= \mathbf{12\ cm}$ *(1)*

2.3 Calculate the perimeter of EACH triangle, and show that the perimeters are in the same ratio as the sides. **(4)**

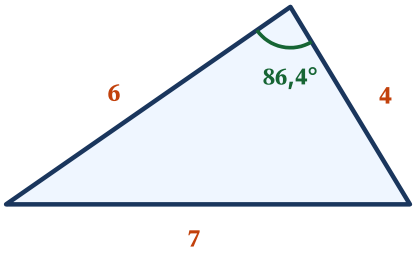
Small: $6 + 8 + 10 = \mathbf{24\ cm}$ *(1)*
Large: $9 + 12 + 15 = \mathbf{36\ cm}$, where $15 = 10 \times 1{,}5$ *(1)*
$\frac{36}{24} = 1{,}5$ *(1)*
which is the same as the scale factor ✓ *(1)*

2.4 Calculate the area of each triangle and explain why the areas are NOT in the ratio $1{,}5 : 1$. **(4)**

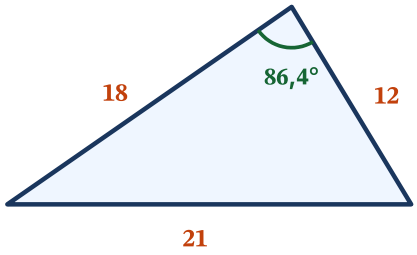
Small: $\frac{1}{2} \times 6 \times 8 = \mathbf{24\ cm^2}$ *(1)*
Large: $\frac{1}{2} \times 9 \times 12 = \mathbf{54\ cm^2}$ *(1)*
$\frac{54}{24} = 2{,}25$ *(1)*
Area scales by $k^2 = 1{,}5^2 = 2{,}25$, not by k *(1)*

QUESTION 3 [7 MARKS]

Answer the following.



△ABC



△PQR

3.1 Explain the difference between CONGRUENT and SIMILAR shapes. **(3)**

> Congruent shapes are exactly the same shape AND size *(1)*
> Similar shapes are the same shape, but not necessarily the same size — the sides are in proportion *(1)*
> In both, corresponding angles are equal *(1)*

3.2 △ABC has sides 4 cm, 6 cm and 7 cm. △PQR has sides 12 cm, 18 cm and 21 cm. Show that the triangles are similar, and write down the scale factor. **(4)**

> $\frac{12}{4} = 3$ *(1)*
> $\frac{18}{6} = 3$ and $\frac{21}{7} = 3$ *(2)*
> All three ratios are equal, so the triangles are similar; $k = 3$ *(1)*

TOTAL: 31 marks

This question paper consists of 3 questions.

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