MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
35	55 minutes	3

Name: _____ Class: _____

Date: _____

MARK ____ / 35

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 Which ONE of these is NOT a condition for congruency? (1)

A) SAS **B)** SSS
C) RHS **D) AAA ✓**

Answer: D — Three equal angles fix the SHAPE but not the SIZE, so AAA gives similarity, not congruency.
- **A** — two sides and the angle between them do fix a triangle
- **B** — three equal sides do fix a triangle completely
- **C** — a right angle, the hypotenuse and one side do fix a triangle

1.2 Two triangles whose corresponding angles are equal are ... (1)

A) similar ✓ **B)** congruent
C) both similar and congruent **D)** neither

Answer: A — Equal angles give the same shape, but the triangles may be different sizes.
- **B** — congruent triangles must be the same SIZE as well
- **C** — they are congruent only if a pair of matching SIDES is equal too
- **D** — equal angles DO make them similar

1.3 In $\triangle ABC$ and $\triangle DEF$, $AB = DE$, $\hat{B} = \hat{E}$ and $BC = EF$. The reason for congruency is ... (1)

A) SSS **B)** RHS
C) SAS ✓ **D)** AAS

Answer: C — Two sides and the angle BETWEEN them are equal.
- **A** — only two pairs of SIDES are given, not three
- **B** — no right angle is mentioned
- **D** — only ONE pair of angles is given

1.4 $\triangle ABC \,|||\, \triangle PQR$ and AB is twice PQ. If BC = 10 then QR = ... (1)

A) 2 **B)** 20

C) 10 **D)** **5 ✓**

> **Answer: D** — Every side of $\triangle ABC$ is twice the matching side of $\triangle PQR$, so $QR = 10 \div 2 = 5$.
> - **A** — that is the scale factor, not a length
> - **B** — MULTIPLIED by 2 instead of dividing
> - **C** — that is BC itself, not its match in the smaller triangle

1.5 Two similar triangles have sides in the ratio 3 : 5. Their AREAS are in the ratio ... (1)

A) 27 : 125 **B)** **9 : 25 ✓**

C) 3 : 5 **D)** 6 : 10

> **Answer: B** — Areas scale by the SQUARE of the side ratio.
> - **A** — that is the ratio of VOLUMES, which uses the cube
> - **C** — that is the SIDE ratio, not the area ratio
> - **D** — doubled both parts of the ratio instead of squaring it

1.6 In congruent triangles $\triangle ABC$ and $\triangle PQR$, written in that order, the side matching AC is ... (1)

A) **PR ✓** **B)** AC

C) PQ **D)** QR

> **Answer: A** — The letters are written in matching order, so A↔P, B↔Q and C↔R.
> - **B** — AC is in the FIRST triangle; the question asks for its match in the second
> - **C** — PQ matches AB
> - **D** — QR matches BC

1.7 RHS can be used only when ... (1)

A) two angles are equal **B)** **both triangles have a right angle ✓**

C) all three sides are known **D)** the triangles are similar

> **Answer: B** — RHS stands for Right angle, Hypotenuse, Side.
> - **A** — two equal angles on their own is AAS, and it still needs a side
> - **C** — three known sides is SSS
> - **D** — similarity is about shape only, while RHS proves congruency

1.8 A photo 8 cm by 12 cm is enlarged so that the shorter side becomes 20 cm. The longer side becomes ... (1)

A) 24 cm **B)** **30 cm ✓**

C) 18 cm **D)** 32 cm

> **Answer: B** — The scale factor is $20 \div 8 = 2{,}5$, so the longer side becomes $12 \times 2{,}5 = 30$ cm.
> - **A** — doubled 12 instead of using the scale factor 2,5
> - **C** — used $12 \div 8 = 1{,}5$ as the scale factor instead of $20 \div 8$
> - **D** — ADDED the 12 cm increase to the 20 instead of scaling

1.9 Congruent triangles are always similar. Similar triangles are ... (1)

A) always congruent
B) never congruent
C) not always congruent ✓
D) never similar

> **Answer: C** — Congruency is similarity with a scale factor of 1; any other scale factor gives similar but non-congruent triangles.
>
> - **A** — similar triangles may be any size
> - **B** — similar triangles ARE congruent when the scale factor is 1
> - **D** — they are similar by definition

1.10 In △ABC, D lies on AB and E on AC with DE ∥ BC. △ADE and △ABC are similar because ... (1)

A) they share a right angle
B) their areas are equal
C) their corresponding angles are equal ✓
D) their sides are equal

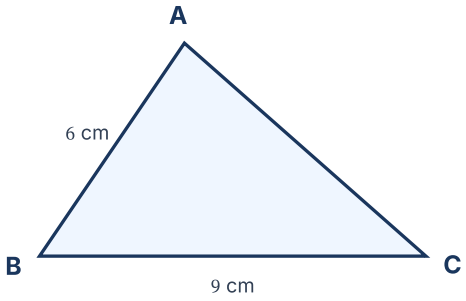
> **Answer: C** — DE ∥ BC makes $A\hat{D}E = A\hat{B}C$ and $A\hat{E}D = A\hat{C}B$, and $\hat{A}$ is shared.
>
> - **A** — no right angle is given anywhere
> - **B** — the areas differ; it is the ANGLES that match
> - **D** — the sides are in PROPORTION, not equal — equal sides would make them congruent

ANSWER GRID — MARKING GUIDELINE

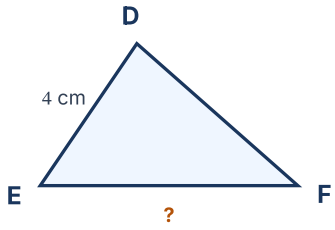
1.1	A	B	C	**(D)**
1.2	**(A)**	B	C	D
1.3	A	B	**(C)**	D
1.4	A	B	C	**(D)**
1.5	A	**(B)**	C	D
1.6	**(A)**	B	C	D
1.7	A	**(B)**	C	D
1.8	A	**(B)**	C	D
1.9	A	B	**(C)**	D
1.10	A	B	**(C)**	D

QUESTION 2 [12 MARKS]

In the diagram, △ABC and △DEF are similar, with △ABC ≡ △DEF. AB = 6 cm, DE = 4 cm and BC = 9 cm.



△ABC



△DEF

2.1 Write down the scale factor from △DEF to △ABC, and explain what that factor tells you about the two triangles. **(3)**

$\frac{AB}{DE} = \frac{6}{4}$ *(1)*
$= \mathbf{1{,}5}$ *(1)*
Every side of △ABC is 1,5 times the corresponding side of △DEF — same shape, larger size *(1)*

2.2 Calculate the length of EF. **(3)**

$\frac{BC}{EF} = 1{,}5$ *(1)*
$EF = \frac{9}{1{,}5}$ *(1)* $= \mathbf{6\ cm}$ *(1)*

2.3 State what is true about the corresponding ANGLES of the two triangles, give a reason, and explain why the SIDES cannot also be equal unless the scale factor is 1. **(3)**

The corresponding angles are EQUAL *(1)*
Similar triangles have the same SHAPE, so they are equiangular *(1)*
A scale factor other than 1 multiplies every side, so equal sides would force the factor to be 1 — which is congruency, not just similarity *(1)*

2.4 Determine the ratio of the AREA of △ABC to the area of △DEF, with a reason. **(3)**

Area ratio = (scale factor)^2 *(1)*
$= 1{,}5^2$ *(1)* $= \mathbf{2{,}25 : 1}$ (or 9 : 4) *(1)*

QUESTION 3 [13 MARKS]

Answer the questions below on congruency.

3.1 Write down the FOUR conditions for two triangles to be congruent. **(4)**

SSS *(1)*; SAS *(1)*; AAS (or ASA) *(1)*; RHS *(1)*

3.2 Explain why AAA is NOT a condition for congruency, and name what AAA does prove. **(3)**

Equal angles fix the SHAPE of a triangle but not its SIZE *(1)*
Two triangles can be equiangular and still be different sizes *(1)*
AAA proves that the triangles are **SIMILAR** *(1)*

3.3 Two right-angled triangles have equal hypotenuses and one other pair of equal sides. Name the condition that proves them congruent, and explain why SAS does not apply here. **(3)**

> **RHS** *(1)*
> The equal angle $(90°)$ is not INCLUDED between the two known equal sides *(2)*

3.4 If $\triangle ABC \equiv \triangle PQR$, write down which side is equal to AC and which angle is equal to $\hat{B}$, and explain how the order of the letters tells you. **(3)**

> AC = **PR** *(1)*
> $\hat{B} = \hat{Q}$ *(1)*
> The letters are written in CORRESPONDING order: A↔P, B↔Q, C↔R, so the first and third letters of each name the matching side *(1)*

TOTAL: 35 marks

This question paper consists of 3 questions.

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