MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
37	1 hour	4

Name: _____ Class: _____

Date: _____

MARK ____ / 37

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 The angles of a triangle add up to ... (1)

A) 180° ✓ B) 360°

C) 540° D) 90°

> **Answer: A** — True for every triangle.
> - **B** — that is a quadrilateral
> - **C** — that is a pentagon
> - **D** — that is a right angle

1.2 The angles of a quadrilateral add up to ... (1)

A) 540° **B) 360° ✓**

C) 270° D) 180°

> **Answer: B** — A quadrilateral splits into TWO triangles.
> - **A** — that is a pentagon
> - **C** — that is three right angles, not four
> - **D** — that is one triangle

1.3 Two angles of a triangle are 55° and 65°. The third is ... (1)

A) 60° ✓ B) 240°

C) 120° D) 70°

> **Answer: A** — $180° - 55° - 65° = 60°$.
> - **B** — used 360°
> - **C** — that is the sum of the two given angles
> - **D** — arithmetic slip

1.4 A triangle with all three sides equal is called ... (1)

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

> **Answer: D** — Equilateral means equal sides, and all its angles are $60°$.
> - **A** — scalene has no equal sides
> - **B** — that describes an angle, not the sides
> - **C** — isosceles has exactly two equal sides

1.5 The base angles of an ISOSCELES triangle are ... (1)

A) always $60°$
B) equal to each other ✓
C) always right angles
D) always different

> **Answer: B** — Equal sides are opposite equal angles.
> - **A** — that is an EQUILATERAL triangle
> - **C** — only in a right-angled isosceles triangle is one angle $90°$
> - **D** — they are equal

1.6 The EXTERIOR angle of a triangle equals ... (1)

A) the largest interior angle
B) the adjacent interior angle
C) $180°$
D) the sum of the two opposite interior angles ✓

> **Answer: D** — Exterior angle = sum of the two interior opposite angles.
> - **A** — not necessarily
> - **B** — it is SUPPLEMENTARY to the adjacent angle
> - **C** — an exterior angle is less than $180°$

1.7 Which quadrilateral has diagonals that bisect each other AT RIGHT ANGLES but are NOT equal? (1)

A) square
B) rectangle
C) trapezium
D) rhombus ✓

> **Answer: D** — A rhombus has perpendicular bisecting diagonals of different lengths.
> - **A** — a square's are equal AND perpendicular
> - **B** — a rectangle's diagonals are equal and not perpendicular
> - **C** — a trapezium's do not bisect each other

1.8 Opposite angles of a PARALLELOGRAM are ... (1)

A) complementary
B) supplementary
C) equal ✓
D) right angles

> **Answer: C** — Opposite angles are equal; CO-INTERIOR angles are supplementary.
> - **A** — they add to $180°$, not $90°$
> - **B** — that is true of CO-INTERIOR angles
> - **D** — only in a rectangle

1.9 Three angles of a quadrilateral are $80°$, $95°$ and $110°$. The fourth is ... (1)

A) $85°$ **B)** $95°$

C) $75°$ ✓ **D)** $285°$

> **Answer: C** — $360° - 80° - 95° - 110° = 75°$.
>
> - **A** — added the three given angles as $275°$ instead of $285°$
> - **B** — copied one of the given angles
> - **D** — that is the SUM of the three given angles, not the fourth

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1.10 Every square is a rectangle because ... (1)

A) it has four right angles ✓ **B)** its diagonals are equal

C) it is a quadrilateral **D)** all its sides are equal

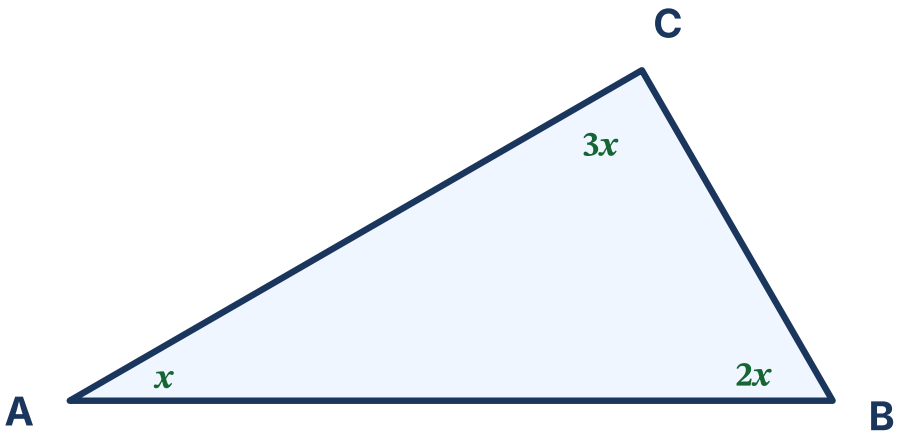
> **Answer: A** — A rectangle is defined by its four right angles, which a square has.
>
> - **B** — equal diagonals follow from the right angles
> - **C** — not every quadrilateral is a rectangle
> - **D** — equal sides make it a rhombus, not a rectangle

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 [10 MARKS]

In △ABC below the three interior angles are given as x, $2x$ and $3x$. *The diagram is not drawn to scale.*



2.1 Calculate the value of x. **(3)**

$x + 2x + 3x = 180°$ *(sum of the angles of a triangle) (1)*
$6x = 180°$ *(1)*
$x = \mathbf{30°}$ *(1)*

2.2 Hence write down the size of each angle, and state what kind of triangle ABC is. Give a reason. **(4)**

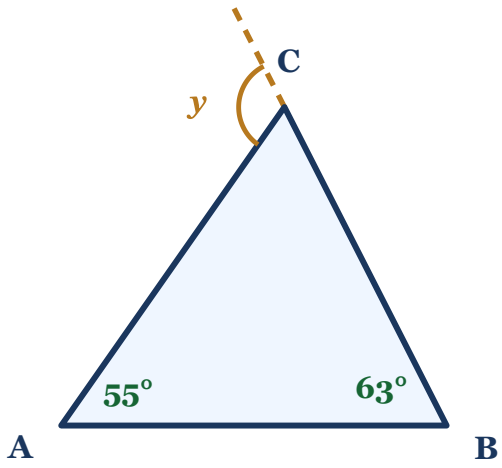
$\hat{A} = \mathbf{30°}$, $\hat{B} = \mathbf{60°}$, $\hat{C} = \mathbf{90°}$ *(2)*
It is a **right-angled** triangle *(1)*
because one of its angles is $90°$ *(1)*

2.3 In a different triangle the three angles are equal. Determine the size of each angle and name the triangle. **(3)**

$3x = 180°$, so $x = \mathbf{60°}$ *(2)*
It is an **equilateral** triangle *(1)*

QUESTION 3 **[7 MARKS]**

In the diagram below, one side of the triangle has been produced to form the exterior angle y. *The diagram is not drawn to scale.*



3.1 Determine, with a reason, the size of y. **(3)**

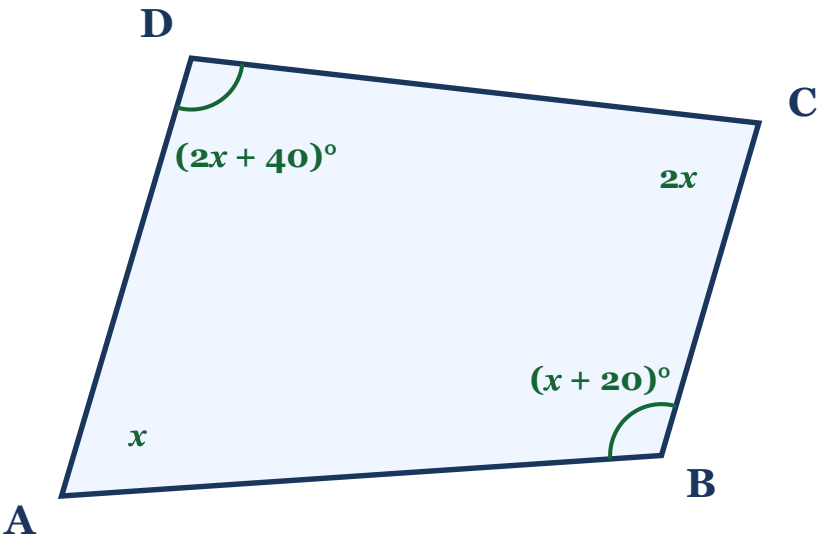
$y = 55° + 63°$ *(exterior angle = sum of the opposite interior angles) (1)*
$= \mathbf{118°}$ *(2)*

3.2 Hence determine the size of the third interior angle of the triangle, in two different ways. **(4)**

Method 1: $180° - 118° = \mathbf{62°}$ *(angles on a straight line) (2)*
Method 2: $180° - 55° - 63° = \mathbf{62°}$ *(angle sum of a triangle) (2)*

QUESTION 4 [10 MARKS]

Answer the following questions about quadrilaterals.



not drawn to scale

4.1 The four angles of a quadrilateral are x, $(x + 20)°$, $2x$ and $(2x + 40)°$. Calculate the value of x. **(3)**

$x + (x + 20) + 2x + (2x + 40) = 360°$ *(sum of the angles of a quadrilateral) (1)*
$6x + 60° = 360°$ *(1)*
$x = \mathbf{50°}$ *(1)*

4.2 Hence write down the sizes of the four angles and check your answer. **(3)**

50° ; 70° ; 100° ; 140° *(2)*
$50 + 70 + 100 + 140 = 360°$ ✓ *(1)*

4.3 PQRS is a parallelogram with $\hat{P} = 70°$. Determine, with reasons, the sizes of $\hat{Q}$ and $\hat{R}$. **(4)**

$\hat{Q} = 180° - 70° = \mathbf{110°}$ *(co-interior angles, PS ∥ QR) (2)*
$\hat{R} = \mathbf{70°}$ *(1)*
(opposite angles of a parallelogram are equal) (1)

TOTAL: 37 marks

This question paper consists of 4 questions.

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