Area & Perimeter of 2-D Shapes (Grade 9)

MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
33	50 minutes	3

Name: _____ Class: _____

Date: _____

MARK ____ / 33

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 area of a trapezium with parallel sides 14 cm and 22 cm and height 9 cm is ... (1)

A) 324 cm^2 **B) 162 cm^2 ✓**

C) 126 cm^2 **D)** 45 cm^2

Answer: B — A = ½$(a + b)h$ = ½(36)(9).

- **A** — forgot to halve
- **C** — used only one parallel side
- **D** — added the three numbers

1.2 The area of a parallelogram with base 12 cm and PERPENDICULAR height 7 cm is ... (1)

A) 38 cm^2 **B) 84 cm^2 ✓**

C) 42 cm^2 **D)** 19 cm^2

Answer: B — A = $b \times h$ — no halving, unlike a triangle.

- **A** — that is the perimeter of a 12 cm by 7 cm rectangle
- **C** — halved it as if it were a triangle
- **D** — added base and height

1.3 The circumference of a circle of radius 7 cm, with π ≈ 3,14, is ... (1)

A) 43,96 cm ✓ **B)** 153,86 cm

C) 21,98 cm **D)** 14 cm

Answer: A — C = 2πr.

- **B** — that is the AREA
- **C** — used πr instead of 2πr
- **D** — that is the diameter

1.4 A circle has an area of $153{,}86\ \text{cm}^2$ ($\pi \approx 3{,}14$). Its RADIUS is ... (1)

A) 49 cm
B) 14 cm
C) **7 cm** ✓
D) 24,5 cm

> **Answer: C** — $r^2 = 153{,}86 \div 3{,}14 = 49$, so $r = 7$.
> - **A** — forgot to take the square root
> - **B** — that is the diameter
> - **D** — halved the area

1.5 If the RADIUS of a circle is doubled, its area is multiplied by ... (1)

A) 8
B) 2
C) **4** ✓
D) π

> **Answer: C** — Area depends on r^2.
> - **A** — that is the volume factor
> - **B** — that is the factor for the CIRCUMFERENCE
> - **D** — π is in both, so it cancels

1.6 A composite shape is a rectangle 10 cm by 6 cm with a 4 cm by 3 cm rectangle cut out. Its area is ... (1)

A) $72\ \text{cm}^2$
B) $60\ \text{cm}^2$
C) $12\ \text{cm}^2$
D) **$48\ \text{cm}^2$** ✓

> **Answer: D** — $60 - 12 = 48$.
> - **A** — ADDED the two areas
> - **B** — forgot to subtract the cut-out
> - **C** — that is the cut-out alone

1.7 The perimeter of a semicircle of radius 10 cm ($\pi \approx 3{,}14$) is ... (1)

A) 31,4 cm
B) **51,4 cm** ✓
C) 41,4 cm
D) 62,8 cm

> **Answer: B** — Half the circumference (31,4) PLUS the diameter (20).
> - **A** — forgot the straight diameter edge
> - **C** — used a radius of 10 instead of a diameter of 20
> - **D** — that is the WHOLE circumference

1.8 Area is measured in ... (1)

A) **cm^2** ✓
B) no units
C) cm^3
D) cm

> **Answer: A** — Two lengths multiplied give a square unit.
> - **B** — every measurement has a unit
> - **C** — that is a volume
> - **D** — that is a length

1.9 A square and a circle both have a perimeter of 40 cm. Which has the LARGER area? (1)

A) it cannot be decided
B) they are equal
C) the circle ✓
D) the square

> **Answer: C** — Square: side 10, area 100 cm^2. Circle: $r \approx 6{,}37$, area ≈ 127 cm^2.
> - **A** — both areas can be calculated
> - **B** — they are not equal
> - **D** — 100 cm^2 is the smaller of the two

1.10 The area of a rhombus with diagonals 12 cm and 16 cm is ... (1)

A) 56 cm^2
B) 28 cm^2
C) 192 cm^2
D) 96 cm^2 ✓

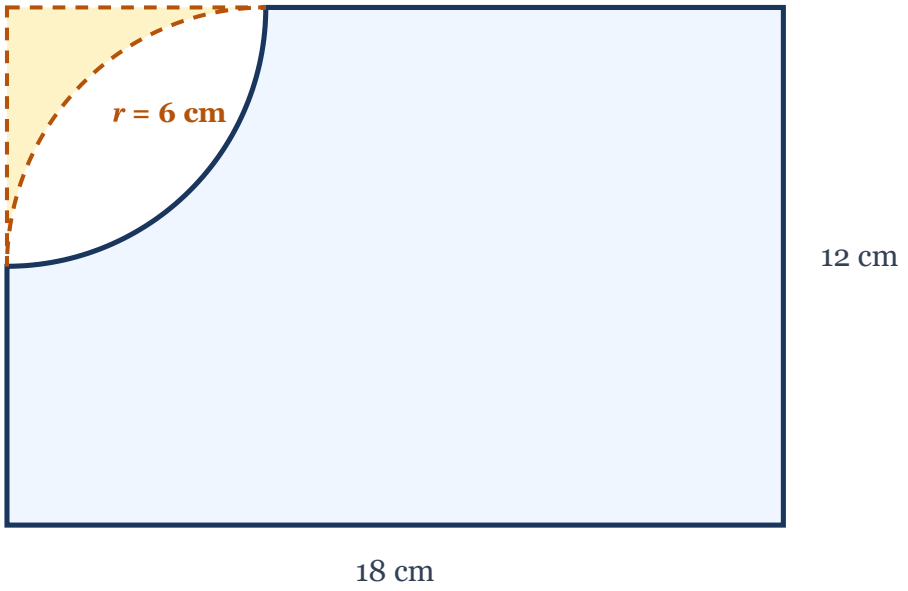
> **Answer: D** — $A = \frac{1}{2} \times d_1 \times d_2$.
> - **A** — that is $2 \times (12 + 16)$, a perimeter, not an area
> - **B** — added the diagonals
> - **C** — forgot to halve

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]

A rectangular metal plate is 18 cm long and 12 cm wide. A quarter circle of radius 6 cm is cut away from one corner. Use $\pi = 3{,}14$.



2.1 Calculate the area of the whole rectangle. **(3)**

$A = l \times b = 18 \times 12$ *(2)*
$= \mathbf{216\ cm^2}$ *(1)*

2.2 Calculate the area of the quarter circle that is cut away, correct to two decimal places. **(4)**

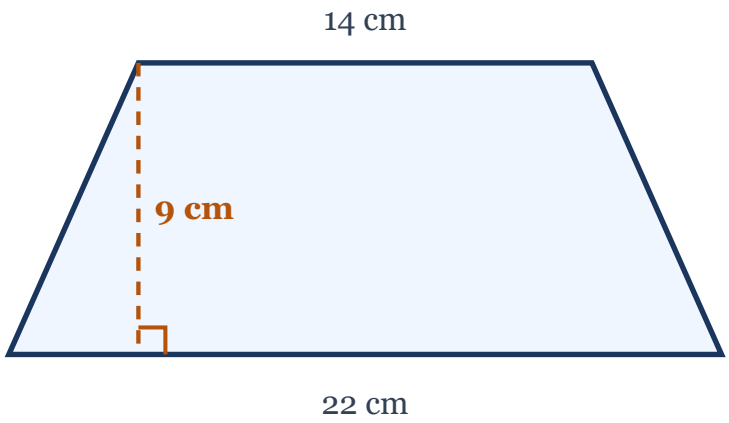
Full circle $= \pi r^2 = 3{,}14 \times 6^2$ *(1)*
$= 3{,}14 \times 36 = 113{,}04\ cm^2$ *(1)*
Quarter $= \frac{113{,}04}{4}$ *(1)*
$= \mathbf{28{,}26\ cm^2}$ *(1)*

2.3 Hence calculate the area of the metal that remains. **(3)**

$216 - 28{,}26$ *(2)*
$= \mathbf{187{,}74\ cm^2}$ *(1)*

QUESTION 3 [13 MARKS]

Answer the following.



3.1 A trapezium has parallel sides of 14 cm and 22 cm and a perpendicular height of 9 cm. Calculate its area. **(3)**

> $A = \frac{1}{2}(a + b)h = \frac{1}{2}(14 + 22)(9)$ *(2)*
> $= \frac{1}{2} \times 36 \times 9 =$ **162 cm²** *(1)*

3.2 The circumference of a circle is 44 cm. Calculate its radius, correct to two decimal places. Use $\pi = 3{,}14$. **(4)**

> $C = 2\pi r$, so $44 = 2(3{,}14)r$ *(1)*
> $44 = 6{,}28r$ *(1)*
> $r = \frac{44}{6{,}28}$ *(1)*
> $=$ **7,01 cm** *(1)*

3.3 Hence calculate the area of that circle, correct to one decimal place. **(3)**

> $A = \pi r^2 = 3{,}14 \times (7{,}0064\ldots)^2$ *(2)* — use the unrounded radius
> $=$ **154,1 cm²** *(1)*
> (Using the rounded radius 7,01 cm gives 154,3 cm², which is also accepted.)

3.4 The radius of a circle is doubled. Explain what happens to its area, and justify your answer. **(3)**

> The area becomes **four times** as large *(1)*
> $A = \pi r^2$, and $(2r)^2 = 4r^2$ *(2)*

TOTAL: 33 marks

This question paper consists of 3 questions.

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