MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
30	45 minutes	3

Name: _____ Class: _____

Date: _____

MARK ____ / 30

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 $\sqrt{112}$ lies between which TWO integers? (1)

A) 11 and 12
B) **10 and 11** ✓
C) 55 and 56
D) 9 and 10

Answer: B — $10^2 = 100$ and $11^2 = 121$, and 112 sits between them.

- **A** — $11^2 = 121$ is ABOVE 112, so 11 is the upper integer, not the lower
- **C** — halved 112 instead of square-rooting it
- **D** — $9^2 = 81$, which is already well below 112

1.2 Which ONE of these numbers is IRRATIONAL? (1)

A) $\frac{22}{7}$
B) $\sqrt{16}$
C) 0,25
D) $\sqrt{20}$ ✓

Answer: D — $\sqrt{20} = 4{,}472\ldots$ — it never terminates and never recurs.

- **A** — a ratio of two integers is rational by definition
- **B** — $\sqrt{16} = 4$, a whole number
- **C** — a terminating decimal is rational

1.3 Rounded to THREE decimal places, $3{,}04528$ is ... (1)

A) $3{,}0453$ **B)** $3{,}05$

C) $3{,}046$ **D) $3{,}045$ ✓**

> **Answer: D** — The fourth decimal is 2, which is less than 5, so the third decimal stays a 5.
>
> - **A** — that is FOUR decimal places
> - **B** — that is TWO decimal places
> - **C** — rounded using the 8 further along instead of the very next digit

1.4 Rounded to THREE significant figures, $0{,}004936$ is ... (1)

A) $0{,}00494$ ✓ **B)** $0{,}004$

C) $0{,}00493$ **D)** $0{,}005$

> **Answer: A** — Leading zeros are not significant, so the first three significant digits are 4, 9 and 3; the next digit is 6, so the 3 rounds up.
>
> - **B** — counted the leading zeros as significant figures
> - **C** — did not round the third digit up
> - **D** — that is ONE significant figure

1.5 Which ONE of these is a NON-TERMINATING, RECURRING decimal? (1)

A) $\frac{1}{8}$ **B)** $\sqrt{2}$

C) $\frac{1}{3}$ ✓ **D)** $0{,}75$

> **Answer: C** — $\frac{1}{3} = 0{,}333\ldots$ — the 3 repeats forever, so it is rational but never terminates.
>
> - **A** — $1 \div 8 = 0{,}125$, which TERMINATES
> - **B** — $\sqrt{2}$ never recurs at all — it is irrational
> - **D** — $0{,}75$ terminates after two decimals

1.6 -3 belongs to which ONE of these sets? (1)

A) the whole numbers **B) the integers** ✓

C) the natural numbers **D)** the irrational numbers

> **Answer: B** — The integers are the whole numbers together with their negatives.
>
> - **A** — the whole numbers start at 0 and include no negatives
> - **C** — the natural numbers start at 1 and include no negatives
> - **D** — -3 is a ratio of integers, so it is RATIONAL

1.7 Which statement about $\sqrt{-9}$ is true? (1)

A) it equals 3 **B)** it equals -3

C) it is non-real ✓ **D)** it is irrational

> **Answer: C** — No real number multiplied by itself gives a negative, so $\sqrt{-9}$ is non-real.
>
> - **A** — $3^2 = 9$, not -9
> - **B** — $(-3)^2 = 9$, not -9
> - **D** — irrational numbers are still REAL numbers

1.8 A plank $3{,}7$ m long is cut into pieces $0{,}8$ m long. How many WHOLE pieces are cut? (1)

A) 5 **B)** 4,625

C) 4 ✓ **D)** 4,6

> **Answer: C** — $3{,}7 \div 0{,}8 = 4{,}625$, and only whole pieces can be cut, so 4.
> - **A** — rounded 4,625 up, but the fifth piece cannot be cut from what is left
> - **B** — that is the unrounded quotient, not a number of pieces
> - **D** — rounded to one decimal place instead of to a whole piece

1.9 Without a calculator, the best estimate of $\sqrt{40}$ is ... (1)

A) 6,3 ✓ **B)** 8

C) 4,5 **D)** 20

> **Answer: A** — $6^2 = 36$ and $7^2 = 49$, so $\sqrt{40}$ sits just above 6; indeed $6{,}3^2 = 39{,}69$.
> - **B** — $8^2 = 64$, which overshoots 40
> - **C** — $4{,}5^2 = 20{,}25$, nowhere near 40
> - **D** — halved 40 instead of square-rooting it

1.10 A circle of radius 5 cm has area 78,539816... cm². Correct to TWO decimal places this is ... (1)

A) 78,53 cm² **B) 78,54 cm² ✓**

C) 79 cm² **D)** 78,5 cm²

> **Answer: B** — The third decimal is 9, so the second decimal 3 rounds up to 4.
> - **A** — truncated instead of rounding — the next digit is 9
> - **C** — that is rounded to the nearest whole number
> - **D** — that is ONE decimal place

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 [9 MARKS]

Answer the following questions WITHOUT the use of a calculator.

2.1 Determine between which TWO consecutive integers $\sqrt{112}$ lies. (3)

> $10^2 = 100$ and $11^2 = 121$ *(2)*
> 112 lies between them, so $\mathbf{10 < \sqrt{112} < 11}$ *(1)*

2.2 Consider the list: -7 ; $\sqrt{16}$; $\sqrt{5}$; $\frac{22}{7}$; π ; $0{,}272727\ldots$ **(3)**

Write down ALL the IRRATIONAL numbers from the list.

> $\sqrt{5}$ and π *(2)*
> The rest are rational: $\sqrt{16} = 4$ and $0{,}272727\ldots = \frac{3}{11}$ *(1)*

2.3 Explain why $\frac{22}{7}$ is RATIONAL even though it is used as an approximation for the irrational number π. **(3)**

> It is a ratio of two integers *(1)*, so by definition it is rational *(1)*
> Its decimal recurs, while π never repeats — the two numbers are not equal *(1)*

QUESTION 3 [11 MARKS]

Answer the questions below.

3.1 Round $3{,}14159$ off to THREE decimal places, and $0{,}04567$ off to THREE decimal places. **(3)**

> $3{,}14159 \rightarrow$ **3,142** *(1)*
> $0{,}04567 \rightarrow$ **0,046** *(2)*

3.2 Determine, without a calculator, between which two consecutive integers $\sqrt{54}$ lies, and state which of the two $\sqrt{54}$ is CLOSER to. Justify your answer. **(5)**

> $7^2 = 49$ and $8^2 = 64$ *(2)*
> $7 < \sqrt{54} < 8$ *(1)*
> 54 is 5 above 49 but 10 below 64 *(1)*
> So it is closer to **7** *(1)*

3.3 A learner rounds $12{,}996$ to TWO decimal places and writes $12{,}99$. Identify the error and give the correct answer. **(3)**

> The learner truncated instead of rounding *(1)*
> The third decimal is 6, so the second must round UP *(1)*
> **13,00** *(1)*

TOTAL: 30 marks

This question paper consists of 3 questions.

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