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 $(\frac{2}{3})^2 = \ldots$ (1)

A) $\frac{4}{3}$ **B)** $\frac{4}{9}$ ✓

C) $\frac{6}{9}$ **D)** $\frac{2}{9}$

Answer: B — Square the top AND the bottom.

- **A** — squared only the numerator
- **C** — multiplied the top AND the bottom by 3 — that gives a fraction equal to $\frac{2}{3}$
- **D** — squared only the denominator

1.2 $\sqrt{\frac{25}{36}} = \ldots$ (1)

A) $\frac{5}{6}$ ✓ **B)** $\frac{5}{18}$

C) $\frac{6}{5}$ **D)** $\frac{25}{6}$

Answer: A — Root the top and the bottom separately.

- **B** — halved the denominator instead of rooting it
- **C** — turned the answer upside down
- **D** — rooted only the denominator

1.3 $\sqrt[3]{\frac{8}{27}} = \ldots$ (1)

A) $\frac{8}{3}$

B) $\frac{2}{3}$ ✓

C) $\frac{4}{9}$

D) $\frac{2}{9}$

Answer: B — $2^3 = 8$ and $3^3 = 27$.

- **A** — cube-rooted only the denominator
- **C** — that is $(\frac{2}{3})^2$
- **D** — divided 27 by 3 instead of cube-rooting it

1.4 $(1\frac{1}{3})^2 = \ldots$ (1)

A) $1\frac{1}{9}$

B) $1\frac{2}{3}$

C) $2\frac{2}{3}$

D) $1\frac{7}{9}$ ✓

Answer: D — Change to an improper fraction first: $(\frac{4}{3})^2 = \frac{16}{9} = 1\ \frac{7}{9}$.

- **A** — squared the whole number and the fraction separately
- **B** — added $\frac{1}{3}$ twice
- **C** — DOUBLED instead of squaring

1.5 Which one of the following is BIGGER than $\frac{1}{4}$? (1)

A) $(\frac{1}{4})^2$

B) $\sqrt{\frac{1}{4}}$ ✓

C) $\frac{1}{5}$

D) $(\frac{1}{4})^3$

Answer: B — $\sqrt{\frac{1}{4}} = \frac{1}{2}$, and taking the root of a number between 0 and 1 moves it CLOSER to 1.

- **A** — $\frac{1}{16}$, which is smaller
- **C** — $\frac{1}{5}$ is smaller than $\frac{1}{4}$
- **D** — $\frac{1}{64}$, which is smaller

1.6 $\sqrt{\frac{9}{16}} + (\frac{1}{2})^2 = \ldots$ (1)

A) $\frac{5}{4}$

B) $\frac{7}{8}$

C) 1 ✓

D) $\frac{3}{2}$

Answer: C — $\frac{3}{4} + \frac{1}{4} = 1$.

- **A** — added the roots without squaring the second term
- **B** — used $\frac{1}{8}$ for the square
- **D** — doubled the first term

1.7 A square has an area of $\frac{49}{100}$ m². The length of one side is … (1)

A) $\frac{7}{10}$ ✓ **B)** $\frac{49}{200}$

C) $\frac{7}{100}$ **D)** $\frac{49}{10}$

> **Answer: A** — $\sqrt{\frac{49}{100}} = \frac{7}{10}$ m.
>
> - **B** — halved the area
> - **C** — rooted only the numerator
> - **D** — rooted only the denominator

1.8 Squaring a fraction between 0 and 1 makes it … (1)

A) bigger **B)** stay the same

C) smaller ✓ **D)** negative

> **Answer: C** — $(\frac{1}{2})^2 = \frac{1}{4}$, which is less than $\frac{1}{2}$.
>
> - **A** — for a positive number, that happens only when it is greater than 1
> - **B** — only 0 and 1 stay the same
> - **D** — squaring never gives a negative

1.9 $(\frac{3}{5})^2 \times \sqrt{\frac{25}{9}} = \ldots$ (1)

A) $\frac{3}{5}$ ✓ **B)** $\frac{9}{25}$

C) 1 **D)** $\frac{5}{3}$

> **Answer: A** — $\frac{9}{25} \times \frac{5}{3} = \frac{45}{75} = \frac{3}{5}$.
>
> - **B** — forgot the second factor
> - **C** — assumed the two cancel completely
> - **D** — used only the second factor

1.10 Which one of the following equals $\frac{1}{8}$? (1)

A) $(\frac{1}{2})^2$ **B)** $(\frac{1}{4})^2$

C) $\sqrt{\frac{1}{4}}$ **D)** $(\frac{1}{2})^3$ ✓

> **Answer: D** — $(\frac{1}{2})^3 = \frac{1}{8}$.
>
> - **A** — $\frac{1}{4}$
> - **B** — $\frac{1}{16}$
> - **C** — $\frac{1}{2}$

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 [11 MARKS]

Calculate the following WITHOUT using a calculator. Leave your answers in the simplest form.

2.1 $(\frac{1}{2})^2 + (\frac{2}{3})^2$ **(4)**

$= \frac{1}{4} + \frac{4}{9}$ *(2)*

LCD = 36: $\frac{9}{36} + \frac{16}{36}$ *(1)*

$= \mathbf{\frac{25}{36}}$ *(1)*

2.2 $\sqrt{\frac{25}{36}}$, and then $\sqrt[3]{\frac{8}{27}}$ **(3)**

Root the top and the bottom separately *(1)*

$\sqrt{\frac{25}{36}} = \mathbf{\frac{5}{6}}$ *(1)*

$\sqrt[3]{\frac{8}{27}} = \mathbf{\frac{2}{3}}$, since $2^3 = 8$ and $3^3 = 27$ *(1)*

2.3 $\sqrt{\frac{49}{64}} - \sqrt[3]{\frac{27}{64}}$ **(4)**

$= \frac{7}{8} - \frac{3}{4}$ *(2)*

$= \frac{7}{8} - \frac{6}{8}$ *(1)* $= \mathbf{\frac{1}{8}}$ *(1)*

QUESTION 3 [12 MARKS]

Answer the questions below.

3.1 Calculate $(1\frac{1}{3})^2$. **(3)**

Change to an improper fraction FIRST: $\frac{4}{3}$ *(1)*

$\frac{16}{9}$ *(1)* $= \mathbf{1\frac{7}{9}}$ *(1)*

3.2 Nomsa writes $(1\frac{1}{3})^2 = 1\frac{1}{9}$. Explain her mistake, and calculate the correct answer. **(3)**

> She squared the whole number and the fraction separately *(1)*
>
> A mixed number must first be written as an improper fraction: $1\frac{1}{3} = \frac{4}{3}$ *(1)*
>
> $(\frac{4}{3})^2 = \frac{16}{9} = \mathbf{1\frac{7}{9}}$ *(1)*

3.3 A square has an area of $\frac{49}{100}$ m^2. Calculate the length of its side, and then its perimeter. **(4)**

> Side $= \sqrt{\frac{49}{100}} = \frac{7}{10}$ m *(2)*
>
> Perimeter $= 4 \times \frac{7}{10}$ *(1)* $= \frac{28}{10} = \mathbf{2\frac{4}{5}}$ **m** *(1)*

3.4 Explain why $\sqrt{\frac{1}{4}}$ is BIGGER than $\frac{1}{4}$. **(2)**

> $\sqrt{\frac{1}{4}} = \frac{1}{2}$ *(1)*, and taking the root of a number between 0 and 1 moves it CLOSER to 1 *(1)*

TOTAL: 33 marks

This question paper consists of 3 questions.

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