

Section II – STANDARD (25 marks)

Y9 Task 1 2024

Attempt all questions

Allow approximately 25 minutes for this section

Multiple Choice

Clearly indicate your final answer for each question.

1. Which of these correctly represents $4 \times 4 \times 4 \times 4 \times 4 \times 5$?
 - a. 4^5
 - b. $4^{5 \times 5}$
 - c. $4^5 \times 5$ ✓
 - d. $(4^5)^5$

2. Simplified correctly, $2a^2 \times 3ab^2$ is:
 - a. $5a^2b^2$
 - b. $5a^3b^2$
 - c. $6a^2b^2$
 - d. $6a^3b^2$ ✓

3. In simplifying $20b^8 \div 5b^3$, which of these is NOT a valid first step:
 - a. Swap the first and second terms around ✓
 - b. Consider the numbers and indices separately
 - c. Use index laws to simplify $b^8 \div b^3$
 - d. Multiply the first term by the inverse of the second term

4. Which of the following scenarios would most likely use numbers written in Scientific Notation?
 - a. The average speed of a car on the motorway
 - b. The land size of a family home, in square metres
 - c. The speed of light, in metres per second ✓
 - d. Average weekly attendance at kids' community cricket games

5. 4×7^{-3} expressed with positive indices is:

- a. 28^3
- b. $4^3 7^3$
- c. $\frac{4}{7^3}$ ✓
- d. $\frac{-4}{7^3}$

6. Which of these represents half the product of g and f, taken away from 5?

- a. $\frac{5g-f}{2}$
- b. $\frac{gf}{2} - 5$
- c. $5 - \frac{g}{f}$
- d. $5 - \frac{gf}{2}$ ✓

7. Substituting $a = 4$ and $b = -3$ into the expression $b^2 - 2a$ gives:

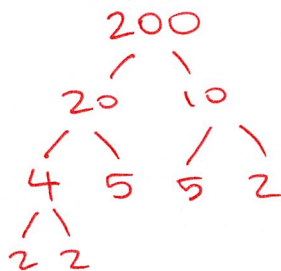
- a. 1 ✓
- b. -1
- c. -14
- d. -17

Short Response

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations

- 8) Express the number 200 as a product of its prime factors, in index form 2

For example, $12 = 2^2 \times 3$. Hint: A factor tree may be useful



① solution (tree or other) correctly used

$$200 = 2 \times 2 \times 5 \times 5 \times 2$$

$$= 2^3 \times 5^2$$

① final answer in index form

- 9) Calculate $(3.42 \times 10^3) \div (2 \times 10^{-2})$. Express your answer in scientific notation 2

$$= 171\,000 \quad \text{①}$$

$$= 1.71 \times 10^5 \quad \text{①}$$

- 10) Simplify the following:

- a. g^0 1

1

- b. $(-2a^2b)^5$ 2

$$= (-2)^5 \times a^{10} \times b^5$$

$$= -32a^{10}b^5 \quad \text{①}$$

① correct understanding of each of the three elements' expansion

- c. $\left(\frac{5w^3}{x}\right)^2$

$$= \frac{5^2 \times w^6}{x^2} \quad \text{①}$$

$$= \frac{25w^6}{x^2} \quad \text{①}$$

11) Express 3×4^{-5} using only a positive index (power)

1

$$= \frac{3}{4^5}$$

12) Simplify by collecting like terms:

1

$$4xy - 3 + 7yx + y + 4 + 5x$$

$$= 11xy + 5x + y + 1$$

13) Expand the following expressions:

a. $5(a + 2b)$

1

$$= 5a + 10b$$

b. $-3(r - 4q)$

1

$$= -3r + 12q$$

14) Solve the following equations

a. $2p + 13 = 17$

1

$$2p = 4$$

$$p = 2$$

b. $\frac{3x}{4} - 2 = 7$

2

$$\frac{3x}{4} = 9$$

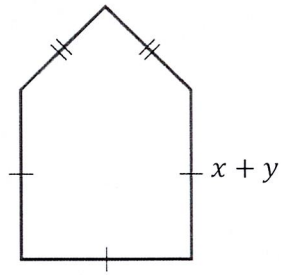
$$3x = 36$$

$$x = 12$$

①

①

- 15) The front entrance of an old church cathedral is accurately sketched by an architect in the following diagram:



If $x = 5$ metres and $y = 8$ metres, and the perimeter of the whole entrance frame is 53 metres, calculate the length of the unknown side 2

$$x + y = 5 + 8$$

$$= 13$$

$\downarrow$ let unknown = u

$$3 \times 13 + u + u = 53$$

$$39 + 2u = 53$$

$$2u = 14$$

$$u = 7\text{m} \quad \textcircled{1}$$

① interprets diagram correctly, determining $x + y = 13$

End of Section II (Standard)

End of assessment task



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Mathematics Formulas (Stage 5)

Index Laws

<u>Indices</u> $a^m \times a^n = a^{m+n}$ $a^m \div a^n = a^{m-n}$ $(a^m)^n = a^{m \times n}$ $a^{-m} = \frac{1}{a^m}$ $a^0 = 1$ $a^{\frac{1}{m}} = \sqrt[m]{a}$	
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