

Name: _____

GCSE (1 – 9)

Indices

Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each Question are shown in brackets
– *use this as a guide as to how much time to spend on each Question.*

Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
- Check your answers if you have time at the end

1 (a) Simplify $x^8 \times x^3$

$$x^{11}$$

(1)

(b) Simplify $(5y)^3$

$$5y \times 5y \times 5y$$

$$125y^3$$

(1)

(c) Simplify $\frac{w^7}{w^4}$

$$w^3$$

(1)

(Total for question 1 is 3 marks)

2 (a) Simplify $a^9 \times a^4$

$$a^{13}$$

(1)

(b) Simplify $(4b^2c)^3$

$$4b^2c \times 4b^2c \times 4b^2c$$

$$64b^6c^3$$

(2)

(c) Simplify $d^9 \div d^4$

$$d^5$$

(1)

(Total for question 2 is 4 marks)

3 (a) Simplify $2m^2 \times 5n^6$

$$10m^2n^6$$

(1)

(b) Simplify $15p^3 \div 3p^4$

$$5p^{-1}$$

(2)

(Total for question 3 is 3 marks)

4 (a) Simplify $(t^3)^4$

$$t^{12}$$

(b) Simplify $12m^2n^6 \div 3mn^4$

$$4mn^2$$

(1)

(2)

(Total for question 4 is 3 marks)

5 Simplify $5m^2n^3 \times 3mn^4$

$$15m^3n^7$$

(Total for question 5 is 2 marks)

6 (a) Write down the value of 5^{-3}

$$\frac{1}{125}$$

(b) Write down the value of 5^0

(1)

$$1$$

(1)

(Total for question 6 is 2 marks)

7 Work out the value of $5^2 \times 2^3$

$$25 \times 8$$

$$200$$

(Total for question 7 is 1 mark)

8 Write down the value of 2^{-3}

$$\frac{1}{8}$$

(Total for question 8 is 1 mark)

9 $y^2 \times y^a = y^7$

(a) Find the value of a .

$(y^4)^b = y^{12}$

(b) Find the value of b .

5

(1)

3

(1)

(Total for question 9 is 2 marks)

10 (a) Given $\frac{x^6}{x^a} = x^8$

Find the value of a .

$a = -2$

(1)

(b) Simplify $(2m^2)^4$

$16m^8$

(2)

(Total for question 10 is 3 marks)

- 11 (a) Write $\frac{3^4 \times 3^5}{3^2}$ as a power of 3

$$\frac{3^9}{3^2} = 3^7$$

$$\frac{3^7}{\dots\dots\dots}$$

(2)

- (b) Write down the value of 3^{-3}

$$\frac{1}{27}$$

(1)

- (c) Write down the value of 3^0

$$1$$

(1)

(Total for question 11 is 4 marks)

- 12 Work out the value of $\frac{2^9 \times 2^{-2}}{2^4}$

$$\frac{2^7}{2^4} = 2^3 = 8$$

$$\frac{2^3}{\dots\dots\dots} 8$$

(Total for question 12 is 2 marks)

- 13 Work out the value of $(2^2)^3$

$$4^3 = 64$$

$$\frac{64}{\dots\dots\dots}$$

(Total for question 13 is 1 mark)

14 (a) Simplify $p^3 \times p^5$

$$\frac{p^8}{(1)}$$

(b) Simplify $(4ab^2)^3$

$$\frac{64a^3b^6}{(2)}$$

(c) Simplify $\frac{16m^7n^3}{4m^3n}$

$$\frac{4m^4n^2}{(2)}$$

(Total for question 14 is 5 marks)

15 $1000^4 = 10^x$

Find the value of x .

$$(10^3)^4 = 10^x$$
$$10^{12} = 10^x$$

$$\frac{12}{(2)}$$

(Total for question 15 is 1 mark)

16 Work out the value of $\frac{2^3 \times 2}{2^5}$

$$\frac{2^4}{2^5} = 2^{-1} = \frac{1}{2}$$

$$\frac{1}{2}$$

(Total for question 16 is 2 marks)

17 Write down the reciprocal of 8

$$\frac{1}{8}$$

(Total for question 17 is 1 mark)

18 (a) Simplify $9p^3 \times 2p^{-2}$

$$\frac{18p}{\dots\dots\dots} \quad (1)$$

(b) Simplify $(5x^3y^2)^3$

$$\frac{125x^9y^6}{\dots\dots\dots} \quad (2)$$

(c) $p^3 \times p^5 = p^{12} \times p^y$

Find the value of y

$$p^8 = p^{12} \times p^y$$

$$\frac{-4}{\dots\dots\dots} \quad (2)$$

(Total for question 18 is 5 marks)

19 $10^x = 1$

Write down the value of x .

$$\frac{0}{\dots\dots\dots}$$

(Total for question 19 is 1 mark)

20 Write $5^4 \times 5$ as a power of 5

$$\frac{5^5}{\dots\dots\dots}$$

(Total for question 20 is 1 mark)

21 Write down the reciprocal of 2

$$\frac{1}{2} \dots\dots\dots$$

(Total for question 21 is 1 mark)

22 (a) Simplify $5c^2d^3 \times 2d$

$$\frac{10c^2d^4}{(1)}$$

(b) Write 64×4^5 as a power of 4

$$4^3 \times 4^5 = 4^8$$

$$\frac{4^8}{(2)}$$

(c) Simplify $p^3 \times (p^5)^2$

$$p^3 \times p^{10}$$

$$\frac{p^{13}}{(2)}$$

(Total for question 22 is 5 marks)

23 $p^9 \times p^5 = p^x$

Write down the value of x

$$\frac{14}{(1)}$$

(Total for question 23 is 1 mark)

24 Write down the reciprocal of $\frac{1}{3}$

$$\frac{3}{(1)}$$

(Total for question 24 is 1 mark)

25 Simplify $\frac{10p^3q^5r}{4p^3q^6}$

$$\frac{\overset{5}{\cancel{10}} \overset{3}{\cancel{p}} \overset{5}{\cancel{q}} r}{\underset{2}{\cancel{4}} \overset{3}{\cancel{p}} \underset{6}{\cancel{q}}}$$

$$\frac{5r}{2q}$$

$$\frac{5r}{2q}$$

(Total for question 25 is 2 marks)

OR $2.5rq^{-1}$