

Name:.....

Total Marks:.....

GCSE (9-1) Grade 4

# Indices



## Instructions

Use **black** ink or ball-point pen.

**Fill in the boxes** at the top of this page with your name.

Answer **all** questions.

Answer the questions in the spaces provided

– there may be more space than you need.

**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.

Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed

## Advice

Read each question carefully before you start to answer it

Attempt every question

Check your answers if you have time at the end

1. (a) Simplify  $m^3 \times m^6$  ..... (1)

(b) Simplify  $\frac{p^8}{p^2}$  ..... (1)

(c) Simplify  $(2n^3)^4$  ..... (2)

**(4 marks)**

---

2. (a) Simplify  $m^6 \times m^7$  ..... (1)

(b) Simplify  $x^0$  ..... (1)

(c) Simplify  $(16y^6)^{\frac{1}{2}}$  ..... (2)

**(4 marks)**

---

3. (a) Simplify  $m^5 \div m^3$  ..... (1)

(b) Simplify  $5x^4y^3 \times x^2y$  ..... (2)

**(3 marks)**

4. (a) Simplify  $a^4 \times a^5$  ..... (1)

(b) Simplify  $\frac{45e^6 f^8}{5ef^2}$  ..... (2)

(c) Write down the value of  $9^{\frac{1}{2}}$  ..... (1)

---

**(4 marks)**

5. (a) Simplify  $m^2 \times m^4$  ..... (1)

(b) Simplify  $y^7 \div y^5$  ..... (1)

(c) Simplify  $(m^3)^5$  ..... (2)

---

**(4 marks)**

6. Simplify fully

(a)  $p^2 \times p^7$  ..... (1)

(b)  $\frac{3q^4 \times 2q^5}{q^3}$  ..... (2)

(c)  $(2xy^3)^5$  ..... (2)

---

**(4 marks)**

7. (a) Simplify  $15y^6 \div 3y^2$

.....  
(2)

(b) Simplify  $7wx^2 \times 3w^3x$

.....  
(2)

---

**(4 marks)**

8. Work out the value of

(a)  $(2^2)^3$

.....  
(1)

(b)  $(\sqrt{3})^2$

.....  
(1)

(c)  $\sqrt{2^4 \times 9}$

.....  
(2)

(d)  $4^{-2}$

.....  
(1)

---

**(5 marks)**

9. (a) Write down the value of  $49^{\frac{1}{2}}$

.....  
(1)

(b) Simplify

(i)  $\frac{x^6}{x^2}$

.....

(ii)  $(y^4)^3$

.....

(2)

---

**(3 marks)**

10. Simplify  $\frac{15a^3 b^7}{3a^2 b^3}$

.....  
**(2 marks)**

11.  $7^5 \times 7^6 = 7^3 \times 7^k$   
Find the value of  $k$ .

$k = \dots\dots\dots$   
**(2 marks)**

12. (a) Simplify  $p^3 \times p^2$

.....  
**(1)**

(b) Simplify  $\frac{q^3 \times q^4 \times q}{q^2}$

.....  
**(2)**  
**(3 marks)**

13. Find the value of

(i)  $36^{\frac{1}{2}}$

.....

(ii)  $3^{-2}$

.....  
**(2 marks)**

14. (a) Write as a power of 7

(i)  $7^8 \div 7^3$

.....

(ii)  $\frac{7^2 \times 7^3}{7}$

.....

(3)

(b) Write down the reciprocal of 2

.....

(1)

**(4 marks)**

---

15. (a) Simplify

$$12y^3 \div 3y^5$$

.....

(2)

(b) Simplify

$$2w^3x^2 \times 3w^4x$$

.....

(2)

**(4 marks)**

---

16. (a) Work out the value of

(i)  $4^2$

.....

(ii)  $\sqrt{64}$

.....

(iii)  $3 \times 2^3$

.....

**(3 marks)**

---

17. Simplify

(i)  $x^4 \times x^5$

.....

(ii)  $\frac{p^8}{p^3}$

.....

(iii)  $3s^2t^3 \times 4s^4t^2$

.....

(iv)  $(q^3)^4$

.....

**(6 marks)**

---

18. Simplify fully

(i)  $(p^3)^3$

.....

(ii)  $\frac{3q^4 \times 2q^5}{q^3}$

.....

**(4 marks)**

---

19. Work out

(i)  $4^0$

.....

(ii)  $4^{-2}$

.....

(iii)  $16^{\frac{3}{2}}$

.....

**(4 marks)**

20. (a) Find the value of

(i)  $64^\circ$

.....

(ii)  $64^{\frac{1}{2}}$

.....

(iii)  $64^{-\frac{2}{3}}$

.....

**(4 marks)**

---