

Exponents (Level 1)

MCQ Test, Set 10

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

- There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
- Each correct answer carries 1 mark. There is no negative marking.
- The key sheet and worked solutions are at the end of this test.

1. $b \times b \times b =$

A. 3^b

B. b^2

C. $3b$

D. b^3

2. $2^{11} = 2048$. Then $2^{12} =$

A. 2050

B. 2060

C. 4096

D. 24,576

3. 10^8 written in figures is

A. 10,00,00,000

B. 1,00,00,00,000

C. 80

D. 1,00,00,000

4. If $19^\square = 361$, the number in the box is

A. 3

B. 19

C. 1

D. 2

5. $20^7 \times 20^{13} =$

A. 20^6

B. 400^{20}

C. 20^{91}

D. 20^{20}

6. $\frac{20^{12}}{20^8} =$

A. 20^4

B. 20^{20}

C. 1

D. $20^{\frac{3}{2}}$

7. $\left(\left(\frac{3}{5}\right)^2\right)^3 =$

A. $\left(\frac{3}{5}\right)^1$

C. $\left(\frac{3}{5}\right)^6$

B. $\left(\frac{3}{5}\right)^5$

D. $\left(\frac{9}{5}\right)^3$

8. $14^2 \times 5^2 =$

A. $(70)^4$

B. $(70)^2$

C. $(19)^2$

D. $(19)^4$

9. $\frac{21^2}{14^2} =$

A. $\frac{3}{2}$

B. $\frac{9}{4}$

C. 49

D. 3

10. $(2^0 + 3^0)^2 =$

A. 4

B. 2

C. 1

D. 25

11. $10^{-2} =$

A. -20

B. $\frac{1}{100}$

C. -100

D. $\frac{1}{20}$

12.	$\left(\frac{1}{2}\right)^{-5} =$	A. $\frac{1}{32}$	B. $-\frac{1}{32}$	C. 32	D. $-\frac{5}{2}$
13.	$(-1)^{333} =$	A. 333	B. -333	C. -1	D. 1
14.	$(-30)^2 =$	A. 60	B. 900	C. -900	D. -60
15.	If $3^{2x-1} = 3^9$, then $x =$	A. 4	B. 9	C. -5	D. 5
16.	If $5^{4y-1} = 125$, then $y =$	A. 1	B. 4	C. $\frac{1}{2}$	D. 3
17.	$\left(\frac{7}{4}\right)^3 =$	A. $\left(\frac{7}{4}\right)^{-3}$	B. $\left(-\frac{4}{7}\right)^3$	C. $\left(\frac{4}{7}\right)^{-3}$	D. $-\left(\frac{4}{7}\right)^{-3}$
18.	$(4n^3)^2 =$	A. $16n^5$	B. $8n^6$	C. $4n^6$	D. $16n^6$
19.	$\frac{11^{10} \times 11^3}{11^{12}} =$	A. 11^1	B. 11^{18}	C. 11^{25}	D. 11^{-1}
20.	$(-2)^{-6} =$	A. 64	B. $-\frac{1}{64}$	C. $\frac{1}{64}$	D. -64
21.	If $(5^3)^x \times 5^2 = 5^{11}$, then $x =$	A. 3	B. $\frac{13}{3}$	C. 9	D. -3
22.	$\left(\frac{1}{4}\right)^{-2} + \left(\frac{1}{7}\right)^{-2} + \left(\frac{1}{9}\right)^{-2} =$	A. -146	B. 40	C. 400	D. 146
23.	$3^{\frac{13}{4}} \div 3^{\frac{5}{4}} =$	A. $\frac{1}{9}$	B. 9	C. $3^{\frac{13}{5}}$	D. $3^{\frac{9}{2}}$
24.	$(4^{-1} - 6^{-1}) \div 5^{-1} =$	A. $\frac{25}{12}$	B. $\frac{5}{2}$	C. $\frac{1}{60}$	D. $\frac{5}{12}$
25.	$(7^1 \div 7^3)^2 \times 7^3 =$	A. $\frac{1}{2401}$	B. $\frac{1}{7}$	C. 343	D. 7

Key sheet

1. D	2. C	3. A	4. D	5. D
6. A	7. C	8. B	9. B	10. A
11. B	12. C	13. C	14. B	15. D
16. A	17. C	18. D	19. A	20. C
21. A	22. D	23. B	24. D	25. B

Solutions

1. $b \times b \times b =$

b is multiplied by itself 3 times.

$$b \times b \times b = b^3$$

Ans: (D) b^3

2. $2^{11} = 2048$. Then $2^{12} =$

$$2^{12} = 2^{11} \times 2$$

$$= 2048 \times 2 = 4096$$

Ans: (C) 4096

3. 10^8 written in figures is

$10^8 = 1$ followed by 8 zeros

$$= 10,00,00,000$$

Ans: (A) 10,00,00,000

4. If $19^\square = 361$, the number in the box is

Dividing repeatedly by 19: 361, 19, that is 2 times.

$$361 = 19^2$$

Ans: (D) 2

5. $20^7 \times 20^{13} =$

Using $a^m \times a^n = a^{m+n}$

$$20^7 \times 20^{13} = 20^{7+13} = 20^{20}$$

Ans: (D) 20^{20}

6. $\frac{20^{12}}{20^8} =$

Using $\frac{a^m}{a^n} = a^{m-n}$

$$\frac{20^{12}}{20^8} = 20^{12-8} = 20^4$$

Ans: (A) 20^4

7. $\left(\left(\frac{3}{5}\right)^2\right)^3 =$

Using $(a^m)^n = a^{m \times n}$

$$\left(\left(\frac{3}{5}\right)^2\right)^3 = \left(\frac{3}{5}\right)^{2 \times 3} = \left(\frac{3}{5}\right)^6$$

Ans: (C) $\left(\frac{3}{5}\right)^6$

8. $14^2 \times 5^2 =$

Using $a^n \times b^n = (a \times b)^n$

$$14^2 \times 5^2 = (14 \times 5)^2 = (70)^2$$

Ans: (B) $(70)^2$

9. $\frac{21^2}{14^2} =$

Using $\frac{a^n}{b^n} = \left(\frac{a}{b}\right)^n$

$$\frac{21^2}{14^2} = \left(\frac{21}{14}\right)^2 = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

Ans: (B) $\frac{9}{4}$

10. $(2^0 + 3^0)^2 =$

$$2^0 + 3^0 = 1 + 1 = 2$$

$$2^2 = 2 \times 2 = 4$$

Ans: (A) 4

11. $10^{-2} =$

Using $a^{-n} = \frac{1}{a^n}$

$$10^{-2} = \frac{1}{10^2} = \frac{1}{100}$$

Ans: (B) $\frac{1}{100}$

12. $\left(\frac{1}{2}\right)^{-5} =$

Using $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$

$$\left(\frac{1}{2}\right)^{-5} = 2^5 = 32$$

Ans: (C) 32

13. $(-1)^{333} =$

333 is odd and $(-1)^{\text{odd number}} = -1$.

$$(-1)^{333} = -1$$

Ans: (C) -1

14. $(-30)^2 =$

Using $(-a)^n = -a^n$ if n is odd, $(-a)^n = a^n$ if n is even

$$(-30)^2 = 30^2 = 900$$

Ans: (B) 900

15. If $3^{2x-1} = 3^9$, then $x =$

Using $a^m = a^n \Rightarrow m = n$

$$\Rightarrow 2x - 1 = 9$$

$$\Rightarrow 2x = 9 + 1$$

$$\Rightarrow 2x = 10$$

$$\Rightarrow x = \frac{10}{2} = 5$$

Ans: (D) 5

16. If $5^{4y-1} = 125$, then $y =$

Given, $5^{4y-1} = 125$

Dividing 125 repeatedly by 5: 125, 25, 5, so $125 = 5^3$.

$$\Rightarrow 5^{4y-1} = 5^3$$

Using $a^m = a^n \Rightarrow m = n$

$$\Rightarrow 4y - 1 = 3$$

$$\Rightarrow 4y = 3 + 1$$

$$\Rightarrow 4y = 4$$

$$\Rightarrow y = \frac{4}{4} = 1$$

Ans: (A) 1

17. $\left(\frac{7}{4}\right)^3 =$

Using $\left(\frac{b}{a}\right)^n = \left(\frac{a}{b}\right)^{-n}$

$$\left(\frac{7}{4}\right)^3 = \left(\frac{4}{7}\right)^{-3}$$

Ans: (C) $\left(\frac{4}{7}\right)^{-3}$

18. $(4n^3)^2 =$

Using $(ab)^n = a^n \times b^n$ and $(a^m)^n = a^{m \times n}$

$$(4n^3)^2 = 4^2 \times (n^3)^2$$

$$= 16 \times n^6 = 16n^6$$

Ans: (D) $16n^6$

19. $\frac{11^{10} \times 11^3}{11^{12}} =$

Using $a^m \times a^n = a^{m+n}$ and $\frac{a^m}{a^n} = a^{m-n}$

$$\frac{11^{10} \times 11^3}{11^{12}} = \frac{11^{13}}{11^{12}}$$

$$= 11^{13-12} = 11^1$$

Ans: (A) 11^1

20. $(-2)^{-6} =$

Using $a^{-n} = \frac{1}{a^n}$

$$(-2)^{-6} = \frac{1}{(-2)^6}$$

$$= \frac{1}{64} = \frac{1}{64} \text{ (6 is even)}$$

Ans: (C) $\frac{1}{64}$

21. If $(5^3)^x \times 5^2 = 5^{11}$, then $x =$

Given, $(5^3)^x \times 5^2 = 5^{11}$

$$\Rightarrow 5^{3x} \times 5^2 = 5^{11} \quad ((a^m)^n = a^{m \times n})$$

$$\Rightarrow 5^{3x+2} = 5^{11} \quad (a^m \times a^n = a^{m+n})$$

Using $a^m = a^n \Rightarrow m = n$

$$\Rightarrow 3x + 2 = 11$$

$$\Rightarrow 3x = 11 - 2$$

$$\Rightarrow 3x = 9$$

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

Ans: (A) 3

22. $\left(\frac{1}{4}\right)^{-2} + \left(\frac{1}{7}\right)^{-2} + \left(\frac{1}{9}\right)^{-2} =$

Using $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$

$$\left(\frac{1}{4}\right)^{-2} + \left(\frac{1}{7}\right)^{-2} + \left(\frac{1}{9}\right)^{-2} = (4)^2 + (7)^2 + (9)^2$$

$$= 16 + 49 + 81$$

$$= 146$$

Ans: (D) 146

23. $3^{\frac{13}{4}} \div 3^{\frac{5}{4}} =$

Using $\frac{a^m}{a^n} = a^{m-n}$

$$3^{\frac{13}{4}} \div 3^{\frac{5}{4}} = 3^{\frac{13}{4} - \frac{5}{4}}$$

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

$$= 9$$

Ans: (B) 9

24. $(4^{-1} - 6^{-1}) \div 5^{-1} =$

$$(4^{-1} - 6^{-1}) \div 5^{-1} = \left(\frac{1}{4} - \frac{1}{6}\right) \div \frac{1}{5}$$

$$= \frac{6-4}{24} \div \frac{1}{5} = \frac{1}{12} \div \frac{1}{5}$$

$$= \frac{1}{12} \times 5 = \frac{5}{12}$$

Ans: (D) $\frac{5}{12}$

25. $(7^1 \div 7^3)^2 \times 7^3 =$

$$(7^1 \div 7^3)^2 \times 7^3 = \left(\frac{7^1}{7^3}\right)^2 \times 7^3$$

$$= (7^{1-3})^2 \times 7^3 = (7^{-2})^2 \times 7^3$$

$$= 7^{-4} \times 7^3 \quad ((a^m)^n = a^{m \times n})$$

$$= 7^{-4+3} = 7^{-1}$$

$$= \frac{1}{7^1} = \frac{1}{7}$$

Ans: (B) $\frac{1}{7}$
