

Exponents (Level 1)

MCQ Test, Set 09

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

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

1. In exponential form, $15 \times 15 \times 15 =$

- A. 3^{15} B. 15^2 C. 45 D. 15^3

2. $16^2 =$

- A. 16 B. 256 C. 18 D. 32

3. Which is the smallest of $2^7, 7^2, 3^4, 5^3$?

- A. 5^3 B. 7^2 C. 2^7 D. 3^4

4. 121 written as a power of 11 is

- A. 11^1 B. 2^{11} C. 11^2 D. 11^3

5. $5^{10} \times 5^{10} =$

- A. 5^{20} B. 5^0 C. 5^{100} D. 25^{20}

6. $100^9 \div 100^3 =$

- A. 100^3 B. 100^6 C. 1 D. 100^{12}

7. $(m^9)^3 =$

- A. m^{12} B. $27m$ C. $3m^9$ D. m^{27}

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

- A. $(16)^{10}$ B. $(10)^{10}$ C. $(16)^5$ D. $(10)^5$

9. $\frac{22^5}{11^5} =$

- A. 10 B. 2 C. 32 D. 1,61,051

10. $(-8)^0 =$

- A. -8 B. 1 C. 0 D. -1

11. $\frac{1}{6^7} =$

- A. 7^{-6} B. -6^7 C. 6^7 D. 6^{-7}

12. $\left(\frac{6}{5}\right)^{-2} =$
A. $-\frac{36}{25}$ **B.** $-\frac{12}{5}$ **C.** $\frac{36}{25}$ **D.** $\frac{25}{36}$
-
13. $(-1)^n = 1$ when n is
A. an even number **B.** a prime number
C. an odd number **D.** one
-
14. $(-9)^2 =$
A. -18 **B.** 18 **C.** 81 **D.** -81
-
15. $1^5 = 1^8$, but $5 \neq 8$. This shows that in $a^m = a^n \Rightarrow m = n$,
A. the rule is never true **B.** a cannot be 1
C. a cannot be 5 or 8 **D.** m must be greater than n
-
16. If $11^{2x-1} = 121$, then $x =$
A. $\frac{1}{2}$ **B.** 3 **C.** $\frac{3}{2}$ **D.** 2
-
17. $2^{5x} =$
A. 32^x **B.** 2^{x+5} **C.** 10^x **D.** $32x$
-
18. $\left(\frac{x^4}{3}\right)^2 =$
A. $\frac{x^8}{9}$ **B.** $\frac{x^8}{3}$ **C.** $\frac{x^8}{6}$ **D.** $\frac{x^6}{9}$
-
19. $13^4 \times 13^4 \times 13^{11} =$
A. 13^8 **B.** 39^{19} **C.** 13^{19} **D.** 13^{176}
-
20. $6^{-1} \times 5^{-1} =$
A. $\frac{1}{30}$ **B.** $\frac{1}{900}$ **C.** $\frac{1}{11}$ **D.** -30
-
21. If $2^x \div 2^{-3} = 32$, then $x =$
A. -8 **B.** 8 **C.** -2 **D.** 2
-
22. $(-1)^2 + (-1)^8 + (-1)^{20} =$
A. 3 **B.** -1 **C.** -3 **D.** 1
-
23. $\frac{9^{\frac{11}{2}} \times 9^{-\frac{5}{2}}}{9^2} =$
A. 9^5 **B.** 9 **C.** $\frac{1}{9}$ **D.** 9^6
-
24. $(-10)^{-6} \div (-10)^{-9} =$
A. $\frac{1}{1000}$ **B.** -1000 **C.** 1000 **D.** $-\frac{1}{1000}$
-
25. $(2z^5)^2 \times (5z)^2 =$
A. $100z^{20}$ **B.** $100z^9$ **C.** $10z^{12}$ **D.** $100z^{12}$
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Key sheet

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

Solutions

1. In exponential form, $15 \times 15 \times 15 =$

15 is multiplied by itself 3 times.

$$15 \times 15 \times 15 = 15^3$$

Ans: (D) 15^3

2. $16^2 =$

$$16^2 = 16 \times 16$$

$$= 256$$

Ans: (B) 256

3. Which is the smallest of 2^7 , 7^2 , 3^4 , 5^3 ?

$$2^7 = 128, 7^2 = 49, 3^4 = 81, 5^3 = 125$$

The smallest is 7^2 .

Ans: (B) 7^2

4. 121 written as a power of 11 is

Dividing repeatedly by 11: 121, 11, that is 2 times.

$$121 = 11^2$$

Ans: (C) 11^2

5. $5^{10} \times 5^{10} =$

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

$$5^{10} \times 5^{10} = 5^{10+10} = 5^{20}$$

Ans: (A) 5^{20}

6. $100^9 \div 100^3 =$

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

$$100^9 \div 100^3 = 100^{9-3} = 100^6$$

Ans: (B) 100^6

7. $(m^9)^3 =$

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

$$(m^9)^3 = m^{9 \times 3} = m^{27}$$

Ans: (D) m^{27}

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

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

$$2^5 \times 8^5 = (2 \times 8)^5 = (16)^5$$

Ans: (C) $(16)^5$

9. $\frac{22^5}{11^5} =$

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

$$\frac{22^5}{11^5} = \left(\frac{22}{11}\right)^5 = 2^5 = 32$$

Ans: (C) 32

10. $(-8)^0 =$

Using $a^0 = 1$ ($a \neq 0$)

$-8 \neq 0$, so $(-8)^0 = 1$

Ans: (B) 1

11. $\frac{1}{6^7} =$

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

$$\frac{1}{6^7} = 6^{-7}$$

Ans: (D) 6^{-7}

12. $\left(\frac{6}{5}\right)^{-2} =$

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

$$\left(\frac{6}{5}\right)^{-2} = \left(\frac{5}{6}\right)^2 = \frac{25}{36}$$

Ans: (D) $\frac{25}{36}$

13. $(-1)^n = 1$ when n is

The notes: $(-1)^{\text{even number}} = 1$, e.g. $(-1)^4 = 1$.

Ans: (A) an even number

14. $(-9)^2 =$

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

$$(-9)^2 = 9^2 = 81$$

Ans: (C) 81

15. $1^5 = 1^8$, but $5 \neq 8$. This shows that in $a^m = a^n \Rightarrow m = n$,

Every power of 1 is 1, so equal powers of 1 need not have equal exponents.

The rule holds only when $a \neq -1, 0, 1$.

Ans: (B) a cannot be 1

16. If $11^{2x-1} = 121$, then $x =$

Given, $11^{2x-1} = 121$

Dividing 121 repeatedly by 11: 121, 11, so $121 = 11^2$.

$$\Rightarrow 11^{2x-1} = 11^2$$

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

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

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

$$\Rightarrow 2x = 3$$

$$\Rightarrow x = \frac{3}{2}$$

Ans: (C) $\frac{3}{2}$

17. $2^{5x} =$

Using $a^{mn} = (a^m)^n$

$$2^{5x} = (2^5)^x = 32^x$$

Ans: (A) 32^x

18. $\left(\frac{x^4}{3}\right)^2 =$

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

$$\left(\frac{x^4}{3}\right)^2 = \frac{(x^4)^2}{3^2}$$

$$= \frac{x^8}{9}$$

Ans: (A) $\frac{x^8}{9}$

19. $13^4 \times 13^4 \times 13^{11} =$

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

$$13^4 \times 13^4 \times 13^{11} = 13^{4+4+11} = 13^{19}$$

Ans: (C) 13^{19}

20. $6^{-1} \times 5^{-1} =$

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

$$6^{-1} \times 5^{-1} = (6 \times 5)^{-1} = 30^{-1}$$

$$= \frac{1}{30^1} = \frac{1}{30}$$

Ans: (A) $\frac{1}{30}$

21. If $2^x \div 2^{-3} = 32$, then $x =$

Given, $2^x \div 2^{-3} = 32$

Dividing 32 repeatedly by 2: 32, 16, 8, 4, 2, so $32 = 2^5$.

$$\Rightarrow 2^{x-(-3)} = 2^5 \left(\frac{a^m}{a^n} = a^{m-n} \right)$$

$$\Rightarrow 2^{x+3} = 2^5$$

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

$$\Rightarrow x + 3 = 5$$

$$\Rightarrow x = 5 - 3$$

$$\Rightarrow x = 2$$

Ans: (D) 2

22. $(-1)^2 + (-1)^8 + (-1)^{20} =$

Using $(-1)^{\text{odd number}} = -1$, $(-1)^{\text{even number}} = 1$

$$(-1)^2 + (-1)^8 + (-1)^{20} = 1 + 1 + 1$$

$$= 3$$

Ans: (A) 3

23. $\frac{9^{\frac{11}{2}} \times 9^{-\frac{5}{2}}}{9^2} =$

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

$$\frac{9^{\frac{11}{2}} \times 9^{-\frac{5}{2}}}{9^2} = \frac{9^{\frac{11}{2} + (-\frac{5}{2})}}{9^2}$$

$$= \frac{9^{\frac{6}{2}}}{9^2} = \frac{9^3}{9^2}$$

$$= 9^{3-2} = 9^1$$

$$= 9$$

Ans: (B) 9

24. $(-10)^{-6} \div (-10)^{-9} =$

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

$$(-10)^{-6} \div (-10)^{-9} = (-10)^{-6-(-9)} = (-10)^{-6+9} = (-10)^3$$

$$= -1000$$

Ans: (B) -1000

25. $(2z^5)^2 \times (5z)^2 =$

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

$$(2z^5)^2 \times (5z)^2 = 2^2 \cdot (z^5)^2 \times 5^2 \cdot z^2$$

$$= 4z^{10} \times 25z^2$$

$$= 100 \cdot z^{10+2} = 100z^{12}$$

Ans: (D) $100z^{12}$
