

PART A - Multiple Choice – write the most correct answer in the space provided

ANSWER

C

1. Evaluate the following: 2^{-5}

- A) -10 B) -32 C)
- $\frac{1}{32}$
- D)
- $-\frac{1}{32}$
- E)
- $\frac{1}{10}$
- F)
- $-\frac{1}{10}$

ANSWER

C

2. What value of x would satisfy the following equation: $\left(\frac{1}{16}\right)^{-\frac{1}{2}x} = 4^{2x+1}$?

- A)
- $x = \frac{1}{2}$
- B)
- $x = -\frac{1}{2}$
- C)
- $x = -1$
- D)
- $x = 2$
- E)
- $x = -2$

ANSWER

A

3. Evaluate a^0bc^{-1} when $a = -2$, $b = 3$, and $c = 10$:

- A)
- $\frac{3}{10}$
- B) -60 C) 0 D)
- $-\frac{3}{5}$
- E) 60 F) None of the above

ANSWER

B

4. Evaluate the following expression: $\frac{5^2}{4^{-2}-4^{-1}}$

- A) 256 B)
- $\frac{-400}{3}$
- C)
- $\frac{-9}{8}$
- D)
- $\frac{-1}{3}$
- E) -3

ANSWER

F

5. Solve for x : $16^{x+1} = 1$

- A) 1 B) 0 C) 2 D) -2 E)
- $\frac{1}{2}$
- F) None of the above

ANSWER

D

6. Which is a fully simplified form of the expression to the right? $[m(m^{2k+1})]^{\frac{1}{2}}$ where $m > 0$

- A)
- m^{k-1}
- B)
- m^2
- C)
- m^k
- D)
- m^{k+1}
- E)
- $2m^{k+2}$
- F)
- $m^{\frac{1}{2}k+\frac{1}{2}}$

ANSWER

E

7. Choose the exponential form of $a = \log_c b$

- A)
- $b^a = c$
- B)
- $a^b = c$
- C)
- $c^b = a$
- D)
- $b^c = a$
- E)
- $c^a = b$

ANSWER

A

8. Solve for x (round to 2 decimal places): $14 = 4^{x-2}$

- A) 3.90 B) 3.77 C) 3.76 D) 3.89 E) 3.81

ANSWER

E

9. Evaluate the following: $(-8)^{-\frac{4}{3}}$

- A) -16 B) -32 C)
- $\frac{-1}{32}$
- D)
- $\frac{-1}{8}$
- E)
- $\frac{1}{16}$

ANSWER

C

10. Solve for x (rounded to 2 decimal places): $15^x = 100$

- A) 1.90 B) 1.77 C) 1.70 D) 1.80 E) 1.98 F) 1.65

ANSWER

B

11. What is the base of the logarithmic function $f(x) = \log x$?

- A) 0 B) 10 C) 1 D) log E)
- x

ANSWER

B

12. Which of the following is the simplified form of $\frac{(2a^2b)^3}{4a^4b^2}$?

- A)
- $3a^2b$
- B)
- $2a^2b$
- C)
- $\frac{2a^2}{b}$
- D)
- $2a^2b^3$
- E)
- $\frac{b}{2a^2}$

ANSWER

C

13. Evaluate the following: $-1^{31} + (-1)^{12} - (-1)^3 - (-1)(1)$

A) -1

B) -2

C) 2

D) 0

E) 1

ANSWER

A

14. Simplify the following expression: $\left(\frac{x}{-y}\right)^{-2}$ A) $\frac{y^2}{x^2}$ B) $\frac{x^2}{y}$ C) $-\frac{y^2}{x^2}$ D) $-\frac{x^2}{y^2}$ E) $-\frac{x^2}{y}$

ANSWER

B

15. Evaluate the following: $(16)^{\frac{1}{4}} \cdot (16)^{\frac{1}{2}}$

A) 16

B) 8

C) 32

D) 64

E) 4

PART B – written solutions - (all values belong to the real number set)

1. Simplify the following expressions (restrictions do not have to be stated):

$$\frac{(-2m^6n^{-3})^2 \cdot (32m^{-10}n^6)}{-24m^4n^{-3}}$$

$$= - \frac{4m^{12}n^{-6} \cdot 32m^{-10}n^6}{24m^4n^{-3}}$$

$$= - \frac{16m^2}{3m^4n^{-3}}$$

$$= - \frac{16n^3}{3m^2}$$

3. Solve for x:

a) $\left(\frac{1}{81}\right)^{3x} = 9^{-5x+4}$

$$(9^{-2})^{3x} = 9^{-5x+4}$$

$$9^{-6x} = 9^{-5x+4}$$

$$\therefore -6x = -5x + 4$$

$$x = -4$$

b) $2^{2x+1} - 17 \cdot 2^x = -8$

$$2 \cdot 2^{2x} - 17 \cdot 2^x = -8$$

$$2(2^x)^2 - 17 \cdot 2^x + 8 = 0$$

$$\text{let } u = 2^x$$

$$2u^2 - 17u + 8 = 0$$

$$(2u-1)(u-8)$$

$$\downarrow \quad \downarrow$$

$$u = \frac{1}{2} \quad u = 8$$

$$2^x = \frac{1}{2} \quad 2^x = 8$$

$$x = -1 \quad x = 3$$

$$\{-1, 3\}$$