

Date Completed: _____
Mentor Initials: _____

A mentor can change everything.



Exponents and Radicals

Non-Calculator: Multiple Choice

- Which of the following is equivalent to the expression $16a^4 + 24a^2b^2 + 9b^4$?
 - $(4a + 3b)^4$
 - $(4a^2 + 3b^2)^2$
 - $(16a^2 + 9b^2)^2$
 - $(16a + 9b)^4$
- If $\frac{x^{a^2}}{x^{b^2}} = x^{27}$, $x > 1$, and $a + b = 3$, what is the value of $a - b$?
 - 4
 - 5
 - 6
 - 9
- Which of the following is equivalent to the expression $\frac{a^7b^6cd^3}{a^5b^7c^4d^2}$?
 - $\frac{a^2bcd^1}{b^6c^4d^2}$
 - $\frac{a^2d}{bc^3}$
 - $a^{\frac{7}{5}} b^{\frac{6}{7}} c^{\frac{1}{4}} d^{\frac{3}{2}}$
 - $a^{12}b^{13}c^5d^5$
- Which of the following is equivalent to $a^{3/4}$?
 - $\sqrt{a^{\frac{1}{4}}}$
 - $\sqrt{a^4}$
 - $\sqrt[3]{a^4}$
 - $\sqrt[4]{a^3}$

5. Which of the following is equivalent to the expression $(16m^2)^{\frac{1}{2}} + (8m^6)^{\frac{1}{3}} - 80^{\frac{1}{2}}$?

- A) $16m + \frac{8}{3}m^2 - 40$
- B) $16m + 2m^2 - 4\sqrt{5}$
- C) $4m + 2m^2 - 4\sqrt{5}$
- D) $4m + \frac{8}{3}m^2 - 40$

6. If $\frac{n^9}{n^6} = 27$, what is the value of n ?

- A) $n = \frac{1}{2}$
- B) $n = 2$
- C) $n = 3$
- D) $n = 9$

7. If $\frac{12^3}{6^3} = 4 + x$, what is the value of x ?

- A) $x = 1$
- B) $x = 2$
- C) $x = 4$
- D) $x = 8$

8. Which of the following is equivalent to the expression $9^{-\frac{1}{2}} \left((a^2)(a^4) - \frac{a^2b^{14}}{ab^8} + c^{\frac{2}{3}} \right)$?

- A) $\frac{a^6 - ab^6 + \sqrt[3]{c^2}}{3}$
- B) $\frac{a^8 - ab^6 + \sqrt{c^3}}{3}$
- C) $3a^6 - a^2b^6 + \frac{2}{3}c$
- D) $3a^8 - ab^6 + \sqrt[3]{c^2}$

9. Which of the following is equivalent to the sum of $4a^2 + a$ and $2a^{\frac{1}{2}} + 3a$?

- A) $a(4a + 1) + 4a$
- B) $2(2a^2 + \sqrt{a} + 2a)$
- C) $(4a)^2 + 4a + \sqrt{2a}$
- D) $4a(1 + a) + \sqrt{2a}$

10. If $a^2 + b^2 = z$ and $ab = y$, which of the following is equivalent to $9z + 18y$?

- A) $(a + 3b)^2$
- B) $(3a + 3b)^2$
- C) $(9a + 9b)^2$
- D) $(3a + 9b)^2$

11. If $x^{\frac{1}{2}} + \sqrt{16} = \sqrt{81}$, what is the value of x ?

- A) 5
- B) 10
- C) 15
- D) 25

12. Which of the following expressions is equivalent to

$$\left(x + \frac{y}{4}\right)^2?$$

- A) $x^2 + \frac{xy}{2} + \frac{y^2}{16}$
- B) $x^2 + \frac{xy}{4} + \frac{y^2}{4}$
- C) $x^2 + \frac{y^2}{16}$
- D) $x^2 + \frac{y^2}{4}$

13. The expression $\frac{x^{-3}y^{\frac{1}{2}}}{x^{\frac{1}{2}}y^{-1}}$, where $x > 1$ and $y > 1$, is equivalent to which of the following?

- A) $\frac{(\sqrt[3]{x})(y\sqrt{y})}{\sqrt{x}}$
- B) $\frac{y\sqrt{y}}{x^3\sqrt{x}}$
- C) $\frac{y\sqrt{x}}{x^3\sqrt{y}}$
- D) $\frac{(\sqrt[3]{x})(\sqrt{y})}{y\sqrt{x}}$