

Rational exponents and Radicals

1) If $x, y > 0$, then $\sqrt[4]{\frac{x^{-4}}{81y^8}} \left(\frac{\sqrt{3}x^{-2}}{(\sqrt{y})^{-1}} \right)^2 =$

- A) $\frac{1}{x^5y}$
 B) $\frac{\sqrt{y}}{x^2}$
 C) $\frac{1}{xy^5}$
 D) x^5y
 E) $\frac{x^5}{y}$

2) If $x > 0$, then the expression $\frac{\sqrt[3]{x^2} \sqrt{\sqrt{x}}}{\sqrt[4]{x^3}}$, simplifies to

- A) $\sqrt[6]{x}$
 B) $\sqrt[4]{x}$
 C) $\sqrt[3]{x}$
 D) $\sqrt[8]{x}$
 E) $\sqrt[9]{x}$

3) If $A = \sqrt{32} - \sqrt{18}$, $B = \sqrt[3]{54} + \sqrt[3]{-16}$, and $C = \sqrt[12]{(-5)^{12}} + \sqrt[9]{(-3)^9}$
 then $(AB)^{3C} =$

- A) 32
 B) 28
 C) -30
 D) 30
 E) 36

4) $\sqrt{12}(\sqrt{50} - \sqrt{18}) =$

A) $4\sqrt{6}$

B) $2\sqrt{3}$

C) $3\sqrt{2}$

D) $9\sqrt{6}$

E) $2\sqrt{6}$

5) If $x \geq 0$ and $y \geq 0$, then $\left(\frac{x^{1/2}y^2}{2y^{1/4}}\right)^4 \cdot \left(\frac{4x^{-2}y^{-4}}{y^2}\right)^{1/2} =$

A) $\frac{xy^4}{8}$

B) $\frac{x^2y^3}{8}$

C) $\frac{x^2y^4}{8}$

D) $\frac{yx^4}{8}$

E) $\frac{xy^2}{8}$

6) $\sqrt[3]{\frac{16(x^5y^7z)^2}{x^2yz^{-6}}} =$

A) $2x^2y^4z^2 \sqrt[3]{2x^2yz^2}$

B) $2x^3y^2z^4 \sqrt[3]{x^2yz^2}$

C) $4x^2y^4z^2 \sqrt[3]{2x^2yz^2}$

D) $2x^2y^2z^3 \sqrt[3]{x^2yz^2}$

E) $x^2y^3z^4 \sqrt[3]{x^2yz^2}$

7) $\left(\frac{-8}{27}\right)^{-2/3} - 2^{1/6}(-32^{1/6}) - 3(-3)^0 =$

A) $\frac{5}{4}$

B) $\frac{3}{2}$

C) $\frac{7}{2}$

D) 2

E) $\frac{29}{4}$

8) If $\sqrt[5]{x^4} \cdot \sqrt[10]{x} = \sqrt[m]{x^n}$, then $m + n =$

A) 19

B) 17

C) 15

D) 16

E) 18

9) If z is a nonzero real number, then $(4z^{-2})^{1/2} \left(\frac{8}{27z^{3/2}}\right)^{-2/3} =$

A) $\frac{9z}{2|z|}$

B) $-\frac{9}{2}$

C) $\frac{9}{2}$

D) $-\frac{3z^2}{4}$

E) $\frac{9z}{4|z|}$

10) If $t - 3x = 3$, then $\left(\frac{125^x}{5^t}\right)^{-\frac{2}{3}} =$

A) 25

B) 1

C) $\frac{1}{25}$

D) 5

E) 125

11) If $x > 0$, $y > 0$ and $\frac{(y^2)^{-1/2}}{(4^{-1}x^2y^4)^{1/2}} = Kx^Ry^S$, then $K + R + S =$

A) -2

B) -3

C) 0

D) -4

E) 1

12) The expression $\left(\frac{-2^4 \cdot (3^{-2} \cdot 2^{-1})^2 \cdot (2\pi)^0}{3^{-7} \cdot (-2)^5}\right)^{-2/3} =$

(a) $\frac{4}{9}$

(b) $\frac{9}{4}$

(c) $\frac{3}{2}$

(d) $\frac{2}{3}$

(e) $-\frac{2}{3}$

13) The expression $\frac{8 \div (2)(4) + 10\sqrt{1.44}}{(-32)^{3/5}} =$

- (a) $-7/2$
- (b) $-13/8$
- (c) -14
- (d) $7/2$
- (e) $13/8$

14) The expression $\sqrt[3]{54x^4y^7} - 5y\sqrt[3]{16x^4y^4}$ simplifies to:

- (a) $-7xy^2\sqrt[3]{2xy}$
- (b) $-2xy\sqrt[3]{2xy}$
- (c) $-13xy^2\sqrt[3]{2xy}$
- (d) $7xy^2\sqrt[3]{2xy}$
- (e) $13xy^2\sqrt[3]{2xy}$

15) The expression $\sqrt[3]{\sqrt{64}} - \sqrt[5]{0.00032}$ is equal to

- (a) 1.8
- (b) 1.98
- (c) 1.9998
- (d) 7.8
- (e) 6.4

16) $\frac{1}{|\sqrt{3}-2|} - \frac{9}{\sqrt{3}} =$

- (a) $2 - 2\sqrt{3}$
- (b) $-2 + 4\sqrt{3}$
- (c) $2 - 4\sqrt{3}$
- (d) $-2 - 2\sqrt{3}$
- (e) $-2 - 4\sqrt{3}$

17) If $M = \frac{2}{1 + \sqrt{3} - \sqrt{12}}$ and $N = 8 \cdot \sqrt[3]{\frac{3}{16}}$, then $M + N =$

- (a) $-1 - \sqrt{3} + 2\sqrt[3]{12}$
- (b) $-2 - \sqrt{3} + \sqrt[3]{6}$
- (c) $2 - \sqrt{3} + 2\sqrt[3]{12}$
- (d) $-1 - \sqrt{3} + \sqrt[3]{3}$
- (e) $2 - \sqrt{3} + \sqrt[3]{6}$

18) The expression $\frac{8 \div (2)(4) + 10\sqrt{1.44}}{(-32)^{3/5}} =$

- (f) $-13/8$
- (g) $-7/2$
- (h) -14
- (i) $7/2$
- (j) $13/8$

19) The expression $\sqrt[3]{54x^4y^7} - 5y\sqrt[3]{16x^4y^4}$ simplifies to:

- (f) $-7xy^2\sqrt[3]{2xy}$
- (g) $-2xy\sqrt[3]{2xy}$
- (h) $-13xy^2\sqrt[3]{2xy}$
- (i) $7xy^2\sqrt[3]{2xy}$
- (j) $13xy^2\sqrt[3]{2xy}$

20) The expression $\sqrt[3]{\sqrt{64}} - \sqrt[5]{0.00032}$ is equal to

- (f) 1.8
- (g) 1.98
- (h) 1.9998
- (i) 7.8
- (j) 6.4

20) The expression $\sqrt{(x+y)^2 - 4xy}$ is equal to

- (a) $|x - y|$
- (b) $|x + y|$
- (c) $x - y$
- (d) $x + y$
- (e) $x + y - 2\sqrt{xy}$

21) If $-5 < x < -2$, then the expression $|x+5| + |x-2| + \sqrt{x^2} + \sqrt[3]{x^3}$ simplifies to

- (a) 7
- (b) $-2x - 3$
- (c) $2x + 3$
- (d) 3
- (e) $2x + 7$

22) For $a, b > 0$, the expression $\left(\frac{25^4 a^3}{b^2}\right)^{1/8} \left(\frac{4^2 b^{-5}}{a^2}\right)^{1/4}$ simplifies to

- A) $\frac{10}{a^{1/8} b^{3/2}}$
- B) $\frac{20}{a^{1/4} b^{5/2}}$
- C) $\frac{50}{a^{3/2} b^{1/8}}$
- D) $10 a^{1/8} b^{3/2}$
- E) $20 a^{1/4} b^{5/2}$

23) $(\sqrt{2} + \sqrt[3]{16})^2$ is equal to

- A) $2 + 4 \cdot \sqrt[6]{32} + 4 \cdot \sqrt[3]{4}$
- B) $2 + \sqrt[6]{16}$
- C) $2 + 4 \cdot \sqrt[6]{4} + 4 \cdot \sqrt[3]{4}$
- D) $2 + \sqrt[3]{256}$
- E) $2 + 2 \cdot \sqrt[5]{32} + \sqrt[9]{16}$

24) $xy^2 \sqrt[3]{16x^6y^4} - 4x^2y \sqrt[3]{128x^3y^7} =$

- A) $-14x^3y^3 \sqrt[3]{2y}$
- B) $-16x^2y^3 \sqrt[3]{2x^2y}$
- C) $-4x^2y^3 \sqrt[3]{2x}$
- D) $-3x^2y^2 \sqrt[3]{2xy}$
- E) $-12x^3y^2 \sqrt[3]{2x^2y}$

25) $\left(\frac{25^4 x^3}{y^2}\right)^{\frac{1}{8}} \left(\frac{4^2 y^{-5}}{x^2}\right)^{\frac{1}{4}}$, where $x > 0$ and $y > 0$, simplifies to :

- A) $\frac{10}{y^{\frac{3}{2}} x^{\frac{1}{8}}}$
- B) $\frac{10 y^{\frac{3}{2}}}{x^{\frac{1}{8}}}$
- C) $\frac{10 x^{\frac{7}{8}}}{y^{\frac{3}{2}}}$
- D) $10 x^{\frac{3}{2}} y^{\frac{1}{8}}$
- E) $\frac{10}{y^{\frac{7}{8}} x^{\frac{3}{2}}}$