

Find the square root.

1) $\sqrt{-361}$

A) -19

C) -180

B) 19

D) Not a real number

2) $-\sqrt{256}$

A) 16

C) -16

B) -128

D) Not a real number

3) $\sqrt{\frac{1}{25}}$

A) $\frac{1}{625}$

B) 5

C) $\frac{1}{5}$

D) 25

4) $-\sqrt{\frac{1}{100}}$

A) $-\frac{1}{10,000}$

C) Not a real number

B) $\frac{1}{10}$

D) $-\frac{1}{10}$

Find the cube root.

5) $-\sqrt[3]{343}$

A) 49

B) -7

C) 7

D) -343

6) $\sqrt[3]{8}$

A) 3

B) 4

C) ± 2

D) 2

7) $\sqrt[3]{-729}$

A) -9

B) 27

C) 81

D) ± 9

8) $\sqrt[3]{\frac{1}{8}}$

A) $\frac{1}{4}$

B) 2

C) $\frac{1}{\sqrt[3]{2}}$

D) $\frac{1}{2}$

Find the root. Assume that all variables represent positive numbers.

- 9) $\sqrt{y^{10}}$
A) $y\sqrt{10}$ B) y^5 C) $5\sqrt{y}$ D) y^{10}
- 10) $\sqrt{16x^8}$
A) $16x^4$ B) $4x^4$ C) $x^4\sqrt{4}$ D) $4x^8$
- 11) $\sqrt[3]{x^{36}}$
A) $\sqrt[3]{x^{36}}$ B) x^{18} C) x^{12} D) x^{33}
- 12) $\sqrt[4]{y^{32}}$
A) y^8 B) y^{28} C) $\sqrt[4]{y^{32}}$ D) y^{16}
- 13) $\sqrt[3]{512x^6}$
A) $22x^2$ B) $64x^2$
C) $8x^2$ D) Not a real number
- 14) $\sqrt[3]{-8x^6}$
A) $4x^2$ B) $2x^2$
C) $-2x^2$ D) Not a real number
- 15) $\sqrt{x^6y^{10}}$
A) x^4y^8 B) x^3y^{10} C) x^6y^5 D) x^3y^5
- 16) $\sqrt{100m^{10}n^{18}}$
A) $50m^5n^9$ B) $10m^5n^9$ C) $50m^8n^{16}$ D) $10m^8n^{16}$
- 17) $\sqrt[3]{-64x^{36}y^{18}}$
A) $-4x^{12}y^6$ B) $16x^{12}y^6$ C) $4x^{12}y^6$ D) $-4x^{18}y^9$

Use the product rule to simplify the radical.

- 18) $\sqrt{44}$
A) 22 B) $\sqrt{44}$ C) $4\sqrt{11}$ D) $2\sqrt{11}$
- 19) $\sqrt{150}$
A) $15\sqrt{2}$ B) $25\sqrt{6}$ C) $5\sqrt{6}$ D) $10\sqrt{3}$
- 20) $2\sqrt{16}$
A) 6 B) 16 C) 8 D) 4

21) $-6\sqrt{147}$ A) $-42\sqrt{3}$ B) $-3\sqrt{42}$ C) $3\sqrt{42}$ D) $42\sqrt{3}$

Use the quotient rule and the product rule to simplify each radical.

22) $\sqrt{\frac{25}{36}}$ A) $\frac{\sqrt{5}}{\sqrt{6}}$ B) 0 C) $\frac{5}{6}$ D) $\frac{\sqrt{5}}{6}$

23) $\sqrt{\frac{63}{25}}$ A) $\frac{9\sqrt{7}}{25}$ B) $\frac{\sqrt{63}}{5}$ C) $\frac{3\sqrt{7}}{5}$ D) $\sqrt{\frac{63}{25}}$

24) $\sqrt{\frac{11}{16}}$ A) $\frac{11}{4}$ B) $\frac{\sqrt{11}}{16}$ C) $\sqrt{\frac{11}{16}}$ D) $\frac{\sqrt{11}}{4}$

25) $\sqrt{\frac{18}{441}}$ A) $\frac{\sqrt{2}}{7}$ B) $\frac{3\sqrt{2}}{21}$ C) $\sqrt{\frac{2}{49}}$ D) $\sqrt{\frac{18}{441}}$

Simplify the radical. Assume that all variables represent positive numbers.

26) $\sqrt{\frac{15}{x^4}}$ A) $\frac{\sqrt{15}}{\sqrt{x^4}}$ B) $\frac{\sqrt{15}}{x^2}$ C) $\frac{\sqrt{15}}{x}$ D) $\frac{\sqrt{15x^4}}{x^4}$

27) $\sqrt{\frac{150}{x^2}}$ A) $\frac{\sqrt{150}}{x}$ B) $\frac{30}{x}$ C) $\sqrt{\frac{150}{x^2}}$ D) $\frac{5\sqrt{6}}{x}$

Simplify the radical.

28) $\sqrt[3]{\frac{12}{125}}$ A) $\sqrt[3]{\frac{12}{125}}$ B) $\frac{\sqrt[3]{12}}{5}$ C) $\frac{\sqrt[3]{12}}{5\sqrt{5}}$ D) $\frac{12}{5}$

Add or subtract as indicated.

29) $22\sqrt{2} - 7\sqrt{2}$

A) 30

B) $29\sqrt{2}$

C) $15\sqrt{2}$

D) 15

Add or subtract by first simplifying each radical and then combining any like radicals.

Assume that all variables represent positive numbers.

30) $5\sqrt{6} + 9\sqrt{54}$

A) $14\sqrt{6}$

B) $22\sqrt{6}$

C) $-32\sqrt{6}$

D) $32\sqrt{6}$

31) $6\sqrt{32} - 6\sqrt{162}$

A) $-30\sqrt{2}$

B) $-78\sqrt{2}$

C) $78\sqrt{2}$

D) $30\sqrt{2}$

32) $\sqrt{48} - \sqrt{192}$

A) $-4\sqrt{3}$

B) $12\sqrt{3}$

C) $-4\sqrt{6}$

D) -12

33) $5\sqrt{162} - 3\sqrt{18} - 4\sqrt{98}$

A) $11\sqrt{2}$

B) $8\sqrt{2}$

C) $-11\sqrt{2}$

D) $5\sqrt{2}$

Simplify the expression. Assume all variables represent positive real numbers.

34) $\sqrt{2x^2} - \sqrt[3]{1080} + \sqrt{128x^2}$

A) $9x\sqrt{2} - 6\sqrt[3]{5}$

B) $8x\sqrt{2} - 6\sqrt[3]{5}$

C) $9\sqrt{2x^2} - \sqrt[3]{1080}$

D) $9x\sqrt{2} - 6\sqrt[3]{30}$

35) $\sqrt[3]{343+12} - \sqrt[3]{18}$

A) $19 - 2\sqrt[3]{9}$

B) $19 - \sqrt[3]{18}$

C) $\sqrt[3]{343+12} - \sqrt[3]{18}$

D) $19\sqrt[3]{18}$

36) $\sqrt{5x^2} - \sqrt[3]{432} + \sqrt{320x^2}$

A) $9x\sqrt{5} - 6\sqrt[3]{2}$

B) $9x\sqrt{5} - 6\sqrt{12}$

C) $8x\sqrt{5} - 6\sqrt[3]{2}$

D) $9\sqrt{5x^2} - \sqrt[3]{432}$

Multiply and simplify. Assume that all variables represent positive real numbers.

37) $5\sqrt{11} \cdot 12\sqrt{110}$

A) $7260\sqrt{10}$

B) $660\sqrt{10}$

C) $660\sqrt{110}$

D) $60\sqrt{1210}$

38) $\sqrt{14x} \cdot \sqrt{14x}$

A) $14x^2$

B) $196x$

C) $14x$

D) $196x^2$

39) $(8\sqrt{y})^2$

A) $64\sqrt{y}$

B) $8y^2$

C) $64y^2$

D) $64y$

40) $\sqrt{3x^5} \cdot \sqrt{15x}$

A) $15x^3\sqrt{5}$

B) $3x^3\sqrt{15}$

C) $3x^6\sqrt{5}$

D) $3x^3\sqrt{5}$

- 41) $\sqrt{8xy^4} \cdot \sqrt{2x^2y^4}$
 A) $4y^4\sqrt{x}$ B) $4xy^4\sqrt{x}$ C) $4xy^8\sqrt{x}$ D) $2xy^4\sqrt{2x}$
- 42) $\sqrt{7}(\sqrt{3} - \sqrt{5})$
 A) $\sqrt{21} - \sqrt{35}$ B) $8\sqrt{7}$ C) $\sqrt{56}$ D) $7\sqrt{3} + 7\sqrt{5}$
- 43) $\sqrt{2}(\sqrt{14} + \sqrt{2})$
 A) $2\sqrt{7} + 2$ B) $4\sqrt{7} + 2$ C) $2\sqrt{7} + 4$ D) $14 + 4$
- 44) $(6\sqrt{11} + 2)(7\sqrt{11} + 8)$
 A) $106\sqrt{11}$ B) $16 + 42\sqrt{11^2} + 48\sqrt{11}$
 C) $58\sqrt{11} + 48$ D) $478 + 62\sqrt{11}$
- 45) $(\sqrt{3} + \sqrt{z})(\sqrt{3} - \sqrt{z})$
 A) $3 - 2\sqrt{z}$ B) $3 - 2\sqrt{3z}$ C) $3 - z$ D) $3z$

Solve the problem.

- 46) Find the area of a rectangle whose length is $6\sqrt{10}$ meters and width is $4\sqrt{50}$ meters.
 A) $240\sqrt{50}$ sq. m B) $2400\sqrt{5}$ sq. m C) $24\sqrt{500}$ sq. m D) $240\sqrt{5}$ sq. m

Divide and simplify. Assume that all variables represent positive real numbers.

- 47) $\frac{\sqrt{54}}{\sqrt{6}}$
 A) $\frac{3}{\sqrt{6}}$ B) $3\sqrt{6}$ C) 6 D) 3
- 48) $\frac{\sqrt{84}}{\sqrt{3}}$
 A) $2\sqrt{7}$ B) $\frac{\sqrt{84}}{3}$ C) $\frac{\sqrt{252}}{3}$ D) 3
- 49) $\frac{\sqrt{90x^7}}{\sqrt{10x}}$
 A) $3x^6$ B) $3x^3\sqrt{10}$ C) $3x^3$ D) $3\sqrt{x^7}$
- 50) $\frac{\sqrt{441x^7}}{\sqrt{7x^5}}$
 A) $3x^6\sqrt{7}$ B) $3x\sqrt{7}$ C) $x\sqrt{63}$ D) $3x\sqrt{49}$

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

51) $\sqrt{\frac{7}{5}}$

A) $\frac{\sqrt{35}}{25}$

B) $\frac{\sqrt{35}}{5}$

C) $\sqrt{7}$

D) $\sqrt{35}$

52) $\frac{5\sqrt{11}}{\sqrt{3}}$

A) $\frac{\sqrt{33}}{15}$

B) $\frac{5\sqrt{33}}{3}$

C) $\frac{\sqrt{825}}{3}$

D) $\frac{15\sqrt{3}}{11}$

53) $\frac{9}{\sqrt{5p}}$

A) $34p$

B) $9\sqrt{5p}$

C) $\frac{81\sqrt{5p}}{5p}$

D) $\frac{9\sqrt{5p}}{5p}$

54) $\frac{5}{\sqrt{p}}$

A) $\frac{25\sqrt{p}}{p}$

B) $\frac{5\sqrt{p}}{p}$

C) $5\sqrt{p}$

D) $\frac{5}{p}$

55) $\frac{1}{\sqrt{10x}}$

A) $\frac{\sqrt{10x}}{10x}$

B) $\sqrt{10x}$

C) $\frac{\sqrt{10x}}{100x^2}$

D) 1