

Tip. When simplifying radical expressions, it is helpful to rewrite a number using its prime factorization and cancel powers.

Example. $108 = 2^2 3^3$ so $\sqrt[3]{108} = \sqrt[3]{2^2 3^3} = 3 \sqrt[3]{2^2} = 3 \sqrt[3]{4}$

1. Evaluate each expression.

(a) $(-3)^4$

(b) -3^4
||

(c) $\left(\frac{1}{8}\right)^2 \cdot (-2)^3$

(d) $(-2)^5$

(e) $-$

Answers

1. (a) 81 (b) -81 (c) $-1/8$ (d) -32 (e) -32 (f) 1 (g) $1/3$ (h) $1/9$
(i) $25/4$ (j) 125 (k) 25 (l) $1/25$ (m) 64 (n) 1000 (o) 10,000

2. (a) $2\sqrt{3}$ (b) $3\sqrt{2}$ (c) $5^3\sqrt{2}$ (d) 3 (e) $3^5\sqrt{2}$ (f) $3^4\sqrt{2}$ (g) $\frac{3\sqrt{3}}{4}$ (h) $\frac{\sqrt{2}}{2}$
(i) $15^3\sqrt{3}$ (j) $2\sqrt{3}$ (k) $8\sqrt{7}$ (l) 4 (m) $5^3\sqrt{4}$ (n) $2^4\sqrt{21}$ (o) 3 (p) $\frac{1}{2}$

3. (a) x^{13} (b) $4x^6$ (c) x^2 (d) y^{15} (e) $27x^3$ (f) y^4 (g) $\frac{1}{z^5}$ (h) $\frac{1}{x^4}$ (i) x^5
(j) $\frac{1}{y^6}$ (k) w (l) $\frac{1}{x^4}$ (m) b^4 (n) z^{16} (o) $\frac{x^7}{9}$ (p) y^9 (q) $-8b^{18}$ (r) $\frac{72}{x^2}$

4. (a) $\frac{x^5y^3}{7}$ (b) $\frac{7y}{4z^4}$ (c) $8y^2$ (d) $\frac{6}{x^5w^3}$ (e) $64w^{15}$ (f) y^3 (g) $1728x^9$ (h) $\frac{y^6}{4}$
(i) $\frac{729}{512z^{15}}$ (j) $\frac{1}{x^3y}$ (k) $\frac{a^{18}}{b^{12}}$ (l) $\frac{x^{11}}{yz^6}$ (m) $\frac{b^{15}}{a^8}$ (n) $\frac{9x^6y}{2}$ (o) w^2v^9 (p) $\frac{4x^9}{y^{13}}$
(q) $\frac{9}{w^2x^6}$ (r) $\frac{1}{8x^6y^9}$

5. (a) $x^{\frac{6}{5}}$ (b) $x^{\frac{3}{8}}$ (c) $x^{-\frac{5}{2}}$ (d) $x^{-\frac{4}{3}}$ (e) $x^{\frac{1}{12}}$ (f) $x^{-\frac{1}{10}}$

6. (a) $x^{\frac{11}{2}}$ (b) $x^{-\frac{22}{7}}$ (c) $x^{-\frac{12}{5}}$ (d) $x^{-\frac{19}{15}}$ (e) $x^{\frac{8}{27}}$ (f) $x^{-\frac{5}{2}}$ (g) x^2 (h) $x^{-\frac{3}{2}}$
(i) $x^{\frac{7}{3}}$ (j) $x^{\frac{3}{5}}$ (k) $x^{-\frac{2}{3}}$ (l) $x^{\frac{5}{4}}$

7. (a) x^2 (b) a^3 (c) $12x^{\frac{3}{4}}$ (d) $2b$ (e) $\frac{1}{x^{\frac{1}{2}}}$ (f) $\frac{1}{9z^2}$ (g) $\frac{1}{x^{\frac{5}{2}}y^2}$ (h) $\frac{-y^6}{2x^2}$
(i) $\frac{x^{\frac{1}{3}}}{y^{\frac{1}{3}}}$ (j) $\frac{a^4}{b}$ (k) $\frac{3y^{\frac{6}{5}}}{x^2}$

Simplifying Absolute Value Problems

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Evaluate each expression.

1) $|-1 - 2|$

2) $9 \div (|3|)$

3) $|1 - 4| \times -2$

4) $-\frac{12}{|-1| + 1}$

5) $|1 - -3| + |5|$

6) $(|3 - 3| -$

Name _____

Date _____ Period _____

11) $x - (|z| + x)$; use $x = 6$, and $z = 3$

-3

12) $6|x + y|$; use