EXPONENTS AND RADICALS

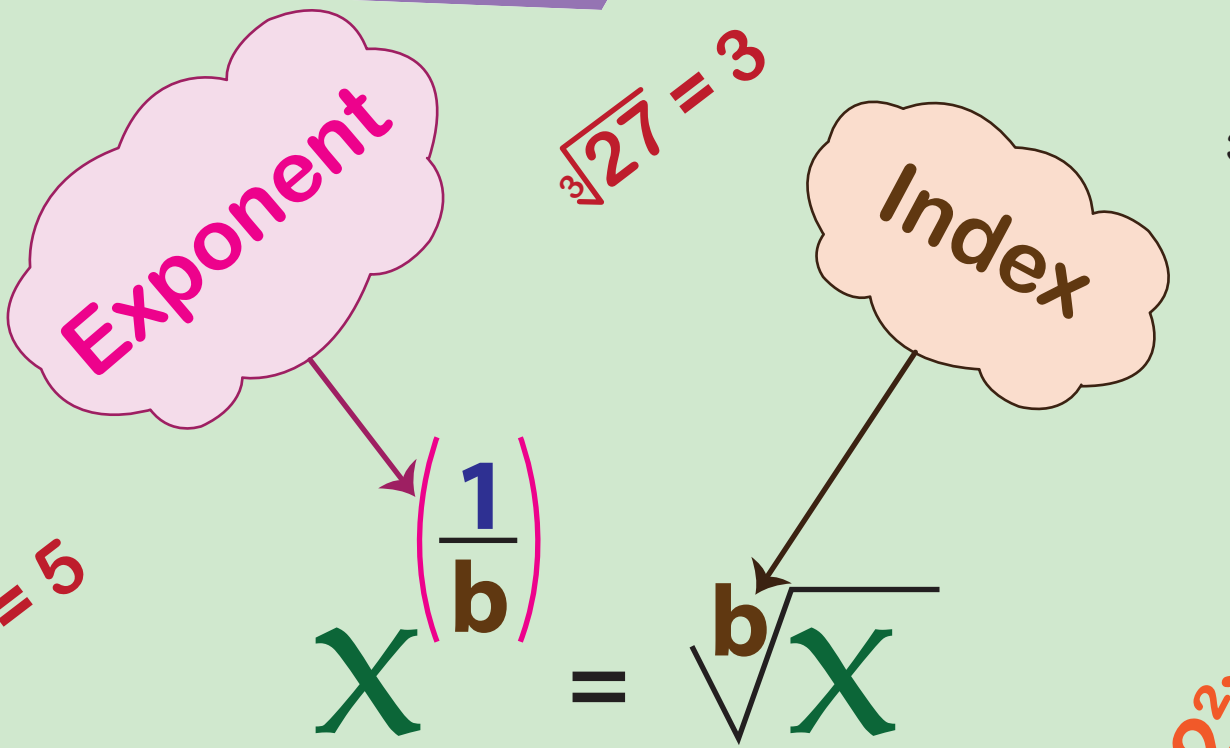
8th Grade

$5^7 \div 5^3 = 5^4$

4^6

$\sqrt[3]{27} = 3$

$\sqrt[3]{8}$



$\sqrt{25} = 5$

$2^2 \times 2^3 = 2^5$

Radical Symbol

Radicand

2^3

7^5

$\sqrt[3]{64} = 4$

Workbook 1

MathWorksheets4Kids.com

Product Rule

E

Use the product rule and rewrite each expression as single exponent.

1) $11^{2} \times 11^{10}$

2) $13^{6} \times 13^{4}$

3) $14^{9} \times 14^{10}$

4) $2^{4} \times 2^{4}$

5) $7^{8} \times 7^{6}$

6) $3^{3} \times 3^{9}$

7) $17^{7} \times 17^{9}$

8) $5^{3} \times 5^{6}$

9) $16^{2} \times 16^{4}$

10) $18^{6} \times 18^{3}$

11) $9^{5} \times 9^{9}$

12) $8^{7} \times 8^{3}$

13) $12^{6} \times 12^{7}$

14) $10^{8} \times 10^{9}$

15) $4^{4} \times 4^{2}$

16) $6^{2} \times 6^{2}$

17) $19^{4} \times 19^{8}$

18) $20^{4} \times 20^{5}$

Product Rule

M

Use the product rule and rewrite each expression as single exponent.

1) $(-12)^4 \times (-12)^{-6}$

2) $(-2)^3 \times (-2)^8 \times (-2)^{10}$

3) $10^{-1} \times 10^5 \times 10^3 \times 10^{-4}$

4) $(-36)^7 \times (-36)^2 \times (-36)^8$

5) $(-7)^{-2} \times (-7)^4$

6) $14^7 \times 14^{-6} \times 14^{10}$

7) $13^7 \times 13^9 \times 13^9 \times 13^4$

8) $5^{-6} \times 5^{-3} \times 5^9 \times 5^8$

9) $(-29)^6 \times (-29)^2$

10) $3^{-2} \times 3^4 \times 3^8$

11) $26^3 \times 26^3$

12) $4^{-6} \times 4^3 \times 4^9$

13) $(-8)^{-5} \times (-8)^4$

14) $35^2 \times 35^{-8} \times 35^{-9}$

15) $18^8 \times 18^{-4} \times 18^5 \times 18^2$

16) $21^2 \times 21^{-3} \times 21^{-9}$

17) $(-9)^3 \times (-9)^{-5}$

18) $(-17)^{-7} \times (-17)^{-10}$

Product Rule

D

Use the product rule and rewrite each expression as single exponent.

1) $20^{-9} \times 20^{-9} \times 20^{5}$

2) $19^{9} \times 19^{5} \times 19^{4}$

3) $(-17)^{7} \times (-17)^{-6}$

4) $19^{-10} \times 19^{-6}$

5) $\left(\frac{2}{5}\right)^{-7} \times \left(\frac{2}{5}\right)^{-8} \times \left(\frac{2}{5}\right)^{4}$

6) $(-9)^{5} \times (-9)^{-8}$

7) $\left(-\frac{7}{8}\right)^{9} \times \left(-\frac{7}{8}\right)^{-2}$

8) $(-8)^{6} \times (-8)^{2} \times (-8)^{5}$

9) $\left(\frac{8}{3}\right)^{-2} \times \left(\frac{8}{3}\right)^{-5} \times \left(\frac{8}{3}\right)^{-7}$

10) $12^{-7} \times 12^{4} \times 12^{-2}$

11) $4^{-8} \times 4^{10} \times 4^{9} \times 4^{10}$

12) $16^{-7} \times 16^{4} \times 16^{6} \times 16^{5}$

13) $\left(-\frac{1}{9}\right)^{3} \times \left(-\frac{1}{9}\right)^{6}$

14) $3^{-3} \times 3^{9} \times 3^{-10} \times 3^{9}$

15) $5^{-5} \times 5^{-7} \times 5^{-8} \times 5^{-8}$

16) $5^{7} \times 5^{-8} \times 5^{3}$

17) $(-2)^{-10} \times (-2)^{2}$

18) $(-15)^{8} \times (-15)^{4}$

Quotient Rule

E

Use the quotient rule and rewrite each expression as single exponent.

1) $10^{10} \div 10^{3}$

2) $7^{10} \div 7^{9}$

3) $18^{9} \div 18^{3}$

4) $12^{5} \div 12^{2}$

5) $15^{10} \div 15^{4}$

6) $17^{7} \div 17^{5}$

7) $4^{9} \div 4^{8}$

8) $20^{8} \div 20^{5}$

9) $14^{5} \div 14^{3}$

10) $16^{6} \div 16^{3}$

11) $11^{9} \div 11^{7}$

12) $6^{9} \div 6^{3}$

13) $9^{10} \div 9^{4}$

14) $5^{9} \div 5^{4}$

15) $13^{7} \div 13^{6}$

16) $19^{9} \div 19^{2}$

17) $2^{4} \div 2^{2}$

18) $8^{6} \div 8^{2}$

Quotient Rule

M

Use the quotient rule and rewrite each expression as single exponent.

1) $17^{-18} \div 17^{7}$

2) $(-8)^{12} \div (-8)^{9}$

3) $11^{-6} \div 11^{-7}$

4) $(-10)^{-5} \div (-10)^{-12}$

5) $33^{11} \div 33^{-8}$

6) $3^{17} \div 3^{9}$

7) $35^{9} \div 35^{8}$

8) $6^{-8} \div 6^{-6}$

9) $(-24)^{13} \div (-24)^{-9}$

10) $12^{-6} \div 12^{-5}$

11) $(-4)^{3} \div (-4)^{-12}$

12) $9^{19} \div 9^{11}$

13) $(-20)^{-10} \div (-20)^{2}$

14) $15^{-20} \div 15^{-13}$

15) $2^{20} \div 2^{-4}$

16) $7^{12} \div 7^{9}$

17) $(-26)^{18} \div (-26)^{-10}$

18) $38^{-15} \div 38^{-16}$

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Simplest Form

M

1) $\sqrt{1859}$ =

2) $\sqrt{4312}$ =

3) $\sqrt{1573}$ =

4) $\sqrt{1539}$ =

5) $\sqrt{833}$ =

6) $\sqrt{336}$ =

7) $\sqrt{1472}$ =

8) $\sqrt{1100}$ =

9) $\sqrt{3584}$ =

10) $\sqrt{575}$ =

11) $\sqrt{171}$ =

12) $\sqrt{240}$ =

13) $\sqrt{756}$ =

14) $\sqrt{1053}$ =

15) $\sqrt{1000}$ =

Square Root - Fractions

E

1) $\sqrt{\frac{4}{16}} =$

2) $\sqrt{\frac{25}{36}} =$

3) $\sqrt{\frac{16}{9}} =$

4) $\sqrt{\frac{49}{64}} =$

5) $\sqrt{\frac{144}{25}} =$

6) $\sqrt{\frac{9}{100}} =$

7) $\sqrt{\frac{49}{121}} =$

8) $\sqrt{\frac{81}{144}} =$

9) $\sqrt{\frac{225}{169}} =$

10) $\sqrt{\frac{16}{196}} =$

11) $\sqrt{\frac{64}{81}} =$

12) $\sqrt{\frac{1}{121}} =$

Simplify and Find the Square Root

M

1) $\sqrt{\frac{27}{48}} =$

2) $\sqrt{\frac{5}{320}} =$

3) $\sqrt{\frac{32}{72}} =$

4) $\sqrt{\frac{200}{128}} =$

5) $\sqrt{\frac{48}{300}} =$

6) $\sqrt{\frac{324}{441}} =$

7) $\sqrt{\frac{384}{54}} =$

8) $\sqrt{\frac{64}{324}} =$

9) $\sqrt{\frac{196}{400}} =$

10) $\sqrt{\frac{96}{726}} =$

11) $\sqrt{\frac{175}{343}} =$

12) $\sqrt{\frac{81}{576}} =$

Find Cube Root

E

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

2) $\sqrt[3]{2744}$ =

3) $\sqrt[3]{64}$ =

4) $\sqrt[3]{1728}$ =

5) $\sqrt[3]{729}$ =

6) $\sqrt[3]{343}$ =

7) $\sqrt[3]{1000}$ =

8) $\sqrt[3]{0}$ =

9) $\sqrt[3]{3375}$ =

10) $\sqrt[3]{8000}$ =

Simplify

1) $\sqrt[3]{16}$ =

2) $\sqrt[3]{54}$ =

3) $\sqrt[3]{375}$ =

4) $\sqrt[3]{320}$ =

5) $\sqrt[3]{162}$ =

6) $\sqrt[3]{1372}$ =

7) $\sqrt[3]{2187}$ =

8) $\sqrt[3]{875}$ =

9) $\sqrt[3]{2662}$ =

10) $\sqrt[3]{576}$ =