

DO NOW

Simplify.

$$1. c^3(c^8)$$

$$c^{11}$$

$$2. (k^3)^8$$

$$k^{24}$$

$$3. \frac{r^3}{r^8}$$

$$\frac{1}{r^5}$$

$$4. 8x^0 - (8x)^0$$

$$8 - 1$$

$$\boxed{7}$$

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1.7 Roots and Radicals

radical - square root

$$\begin{array}{c} \text{index} \rightarrow \# \sqrt{\quad} \leftarrow \text{radical sign} \\ \text{(If not seen, it is a 2.)} \quad \# \leftarrow \text{radicand} \end{array}$$

inverse operations - + and -
 $\times$ and $\div$
 $()^2$ and $\sqrt{\quad}$

★ In the order of operations, this goes in the exponent category.

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CAN BE $\rightarrow$ rational | irrational

written as a fraction.

1. fractions
2. integers
3. terminating decimals
4. repeating decimals
5. $\sqrt{\text{perfect squares}}$

1. π
2. nonterminating nonrepeating decimals
3. $\sqrt{\text{not a perfect square}}$

perfect squares: # - 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225...

has an even exponent $\rightarrow$ variables - $x^2, x^4, x^6, x^8, x^{10} \dots$
 $(x)^2, (x^2)^2, (x^3)^2$

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square roots and signs:

$$\sqrt{16} = 4 \text{ or } -4$$

principal root - positive root

$$+\sqrt{4} = 2$$

$$-\sqrt{4} = -2$$

$$\pm\sqrt{4} = \pm 2$$

$$\sqrt{4} = 2$$

★ If you introduce a radical into a problem, you must put $\pm$ in front of it.

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Using your calculator:

$$\sqrt{\quad} \rightarrow \boxed{\text{CTRL}} \boxed{\sqrt{\quad}}$$

$$\left. \begin{array}{l} \sqrt[3]{\quad} \\ \sqrt[4]{\quad} \end{array} \right\} \boxed{\text{CTRL}} \boxed{\sqrt[x]{\quad}} \rightarrow \text{put in index}$$

$$\begin{array}{ccc} (\sqrt{9})^2 & (\sqrt{49})^2 & (\sqrt{17})^2 \\ (3)^2 & (7)^2 & 17 \\ 9 & 49 & \sqrt{1034}^2 \\ & & 1034 \end{array}$$

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To find square roots of fractions:

take the square root of each part

$$\sqrt{\frac{9}{64}} = \frac{\sqrt{9}}{\sqrt{64}} = \frac{3}{8}$$

To find square roots of decimals:

The decimal must have an even number of decimal places.

The number of decimal places in the answer is half the number of decimal places in the given.

$$\sqrt{0.0036}$$

$$0.06$$

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Solve equations with exponents:

*** Use inverse operations

1. $x^2 = 49$

$$x = \pm \sqrt{49}$$

$$x = \pm 7$$

2. $b^2 = \frac{4}{81}$

$$b = \pm \sqrt{\frac{4}{81}}$$

$$b = \pm \frac{2}{9}$$

3. $m^2 = 0.0016$

$$m = \pm \sqrt{0.0016}$$

$$m = \pm 0.04$$

4. $y^3 = 27$

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

$$y = 3$$

HOMEWORK

Worksheet - HW Intro to Radicals