

Content and Language Objective:

Students will find solutions to real-world applications of rational-exponential, exponential, and power functions and write sentences stating what their solutions means in the real-world.

Warm-Up

1. $9\sqrt[5]{x} + 4 = 17$ $(\sqrt[5]{x})^5 = 1.44^5$ $1.44^{5/1}$
 $\quad \quad \quad -4 \quad -4$
 $\quad \quad \quad 9\sqrt[5]{x} = 13$ $x = 6.19$
 $\quad \quad \quad \sqrt[5]{x} = 1.44$
2. $4\sqrt[3]{x^2} = \sqrt{35}$ $\sqrt[3]{x^2} = 1.48$
 $\frac{4\sqrt[3]{x^2}}{4} = \frac{5.92}{4}$ $x^{2/3} = 1.48^{3/2}$
 $\quad \quad \quad x = 1.8$

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We have seen that many equations can be solved by undoing the order of operations. We did this strategy in 5.2 with some simple power equations. We can also do this procedure with more complex real-life situations.

The formula for **how to solve a real-world application** is:

Ending value = Starting value $(1 \pm r)^{\text{time}}$

$$P = P_0(1 \pm r)^t$$

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SADMEP

Rita wants to invest \$500 in a savings account so that its doubling time will be 8 years. What annual percentage rate is necessary for this to happen?

End value $P = 1000$

Start value $P_0 = 500$

rate $r =$

time $t = 8$

$$\frac{1000}{500} = \frac{500}{500} (1+r)^8$$

$$2^{\frac{1}{8}} = (1+r)^{\frac{8}{8} \cdot \frac{1}{8}}$$

$$2^{\frac{1}{8}} = 1+r$$

$$1.09 = 1+r$$

$$\begin{array}{r} -1 \quad -1 \\ \hline .09 = r \end{array}$$

$$r = .09 \times 100$$

$$r = 9\%$$

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$$(27x^6)^{\frac{2}{3}}$$

$$9x^4$$

$$(36x^{-12})^{\frac{3}{2}}$$

$$\frac{216}{x^{18}}$$

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$$(16x^8)^{\frac{3}{4}}$$

$$8x^6$$

$$12(.079) = \frac{x}{12} \cdot 12$$

$$.95 = x$$

$$95\% = x$$

$$\frac{1450}{800} = \frac{800}{800} \left(1 + \frac{x}{12}\right)^{7.8}$$

$$1.81^{\frac{1}{7.8}} = \left(1 + \frac{x}{12}\right)^{7.8 \cdot \frac{1}{7.8}}$$

$$1.81^{\frac{1}{7.8}} = 1 + \frac{x}{12}$$

$$\begin{array}{r} 1.079 = 1 + \frac{x}{12} \\ -1 \quad -1 \end{array}$$

$$.079 = \frac{x}{12}$$

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Warm - Up

Please get out your 5.3 homework to check your answers.