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Absolute Value Equations /

Inverse Proportion Functions

Examples and Vocabulary

Notes/Comments/Questions

①

$$A(x) = \begin{cases} -x, & \text{if } x < 0 \\ x, & \text{if } x \geq 0 \end{cases}$$

"
|x|

Evaluate.

$$A(-10) = -(-10) = 10 = |-10|$$

$$A(-5) = -(-5) = 5 = |-5|$$

$$A(0) = 0 = |0|$$

$$A(12) = 12 = |12|$$

② Solve each equation.

a. $|x-6| = 15$

$$x-6=15$$

$$x=21$$

or

$$x-6=-15$$

$$x=-9$$

b. $|1-2x| = 3$

$$1-2x=3$$

$$-2x=2$$

$$x=-1$$

$$1-2x=-3$$

$$-2x=-4$$

$$x=2$$

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Examples and Vocabulary	Notes/Comments/Questions
The quantity y is <u>inversely proportional</u>, or <u>varies inversely</u>, to the quantity x means $y = f(x) = \frac{k}{x}$ The number k is called the <u>constant of proportionality</u>. ③ The quantity y is inversely proportional to the quantity x, and $y=6$ when $x=5$. a. Find k. $y = f(x) = \frac{k}{x} = \frac{30}{x}$ $5 \cdot 6 = \frac{k}{5} \cdot 5$ $30 = k$	

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Examples and Vocabulary	Notes/Comments/Questions
b. Find y when $x=20$.	$y = \frac{30}{20} = \frac{3}{2}$

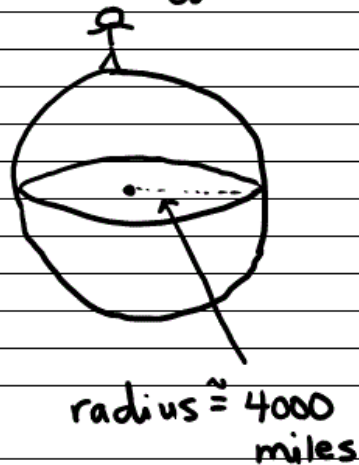
c. Find x when $y=15$.

$$x \cdot 15 = \frac{30}{x} \cdot x$$

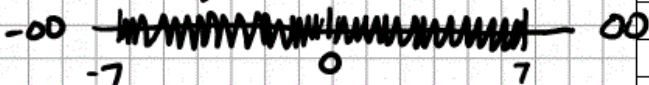
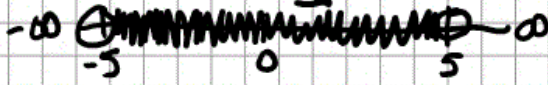
$$\frac{15x}{15} = \frac{30}{15}$$

$$x = 2$$

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Examples and Vocabulary	Notes/Comments/Questions
④ The weight (w) of an object is inversely proportional to the <u>square</u> of the object's distance (d) from the center of the Earth. If a person weighs 160 lb on the Earth's surface, what will the person weigh 100 miles above the surface? $4000^2 \cdot 160 = \frac{k}{4000^2} \cdot 4000^2$ $4000^2 \cdot 160 = k$ $2560000000 = k$ $W = \frac{2560000000}{4100^2} \sim 152.3$	$W = \frac{k}{d^2}$ $W = \frac{2560000000}{d^2}$  radius $\approx$ 4000 miles

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Examples and Vocabulary	Notes/Comments/Questions
⑤ a. Solve the inequality $ 2x - 7 \leq 7$  $\begin{aligned} -7 &\leq 2x - 7 \leq 7 \\ +7 &\quad +7 \quad +7 \\ 0 &\leq \frac{2x}{2} \leq \frac{14}{2} \rightarrow \end{aligned}$	$[0, 7]$ $0 \leq x \leq 7$
b. $3 - 2x < 5$  $\begin{aligned} -5 &< 3 - 2x < 5 \\ -3 &\quad -3 \quad -3 \\ -8 &< -2x < 2 \\ -2 &\quad -2 \quad -2 \\ 4 &> x > -1, \quad (-1, 4) \end{aligned}$	$ 3 - 2 \cdot 5 < 5$ $ 3 - 10 < 5$ $ -7 < 5, \text{ false}$