

warm up: page 34

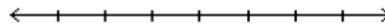
Fill in the blanks below on your notebook and try to answer letters a-f

2-7 Solving Absolute Value Equations

Vocabulary

Absolute Value – Every number has an absolute value which describes the number's distance from zero on a number line. We ask for and describe a number's absolute value with bars which look like this: $||$

Example:



What is the absolute value of each of the following?

- a. $|4| = 4$ b. $|-6| = 6$ c. $|203| = 203$ d. $|-56| = 56$ e. $|7.2| = 7.2$ f. $|-9.1| = 9.1$

answers: HW page 24

1) $\frac{10}{k} = \frac{8}{4}$
 $\frac{8k}{8} = \frac{40}{8}$
 $k = 5$

2) $\frac{m}{12} = \frac{7}{3}$
 $\frac{3m}{3} = \frac{84}{3}$
 $m = 28$

3) $\frac{2}{x} = \frac{7}{9}$
 $\frac{7x}{7} = \frac{18}{7}$
 $x = 2\frac{4}{7}$

4) $\frac{x}{12} = \frac{10}{2}$
 $\frac{2x}{2} = \frac{120}{2}$
 $x = 60$

5) $\frac{4}{9} = \frac{2}{x}$
 $\frac{4x}{4} = \frac{18}{4}$
 $x = 4\frac{1}{2}$

6) $\frac{p}{8} = \frac{13}{2}$
 $\frac{2p}{2} = \frac{104}{2}$
 $p = 52$

7) $\frac{10}{12} = \frac{2}{n}$
 $\frac{10n}{10} = \frac{24}{10}$
 $n = 2\frac{2}{5}$

8) $\frac{10}{m} = \frac{4}{6}$
 $\frac{4m}{4} = \frac{60}{4}$
 $m = 15$

1.	5
2.	28
3.	$2\frac{4}{7}$
4.	60
5.	$4\frac{1}{2}$
6.	52
7.	$2\frac{2}{5}$

9) $\frac{x}{4} = \frac{x+2}{8}$ 724

$$8x = 4(x+2)$$

$$8x = 4x + 8$$

$$-4x \quad \leftarrow$$

$$4x = 8$$

$$\frac{4x}{4} = \frac{8}{4}$$

$$x = 2$$

12) $\frac{9}{5} = \frac{6}{x+1}$

$$9(x+1) = 30$$

$$9x + 9 = 30$$

$$\quad \leftarrow -9$$

$$9x = 21$$

$$\frac{9x}{9} = \frac{21}{9}$$

$$x = 2\frac{1}{3}$$

15) $\frac{5}{x-2} = \frac{3}{x+2}$

$$5(x+2) = 3(x-2)$$

$$5x + 10 = 3x - 6$$

$$-3x \quad \leftarrow \quad -10$$

$$2x = -16$$

$$\frac{2x}{2} = \frac{-16}{2}$$

$$x = -8$$

10) $\frac{7}{10} = \frac{x+3}{5}$

$$10(x+3) = 35$$

$$10x + 30 = 35$$

$$\quad \leftarrow -30$$

$$10x = 5$$

$$\frac{10x}{10} = \frac{5}{10}$$

$$x = \frac{1}{2}$$

13) $\frac{x+4}{2} = \frac{x+3}{3}$

$$3(x+4) = 2(x+3)$$

$$3x + 12 = 2x + 6$$

$$-2x \quad \leftarrow \quad -12$$

$$x = -6$$

16) $\frac{4}{2x-5} = \frac{3}{x+5}$

$$3(2x-5) = 4(x+5)$$

$$6x - 15 = 4x + 20$$

$$-4x \quad \leftarrow \quad +15$$

$$2x = 35$$

$$\frac{2x}{2} = \frac{35}{2}$$

$$x = 17\frac{1}{2}$$

11) $\frac{4}{x} = \frac{6}{x-2}$

$$6x = 4(x+2)$$

$$6x = 4x + 8$$

$$-4x \quad \leftarrow$$

$$2x = 8$$

$$\frac{2x}{2} = \frac{8}{2} \quad x = 4$$

14) $\frac{2x-1}{5} = \frac{4x+2}{9}$

$$5(4x+2) = 9(2x-1)$$

$$20x + 10 = 18x - 9$$

$$-18x \quad \leftarrow \quad -10$$

$$2x = -19$$

$$\frac{2x}{2} = \frac{-19}{2}$$

$$x = -9\frac{1}{2}$$

17) $\frac{x+6}{3} = \frac{5}{x}$

$$x(x+6) = 15$$

$$x^2 + 6x = 15$$

$$\quad \leftarrow -15$$

$$x^2 + 6x - 15 = 0$$

$$(x+9)(x-1) = 0$$

$$x = -9 \text{ or } x = 1$$

8.	15
9.	2
10.	$\frac{1}{2}$
11.	4
12.	$2\frac{1}{3}$
13.	-6
14.	$-9\frac{1}{2}$
15.	-8
16.	$17\frac{1}{2}$
17.	9

answers: HW page 25

1. An object that weighs 12 pounds on Earth, would weigh only 2 pounds on the moon. How much would a kid who weighs 84 pounds on Earth, weigh on the moon?

$$\frac{12}{2} = \frac{84}{x} \quad \frac{12x = 168}{12 \quad 12} \quad x = 14 \quad \boxed{14 \text{ pounds}}$$

2. A speedboat factory can produce 12 boats in 8 days. How many days will it take the factory to produce 30 speedboats?

$$\frac{12}{8} = \frac{30}{x} \quad \frac{12x = 240}{12 \quad 12} \quad x = 20 \quad \boxed{20 \text{ days}}$$

3. A biscuit recipe for 60 biscuits calls for 4 cups of flour. How much flour is needed to make 90 biscuits?

$$\frac{60}{4} = \frac{90}{x} \quad \frac{60x = 360}{60 \quad 60} \quad x = 6 \quad \boxed{6 \text{ cups}}$$

4. Darwin can read 7 pages of his book in 5 minutes. At this rate, how long will it take him to read the entire 175 page book.

$$\frac{7 \text{ pgs}}{5 \text{ min}} = \frac{175}{x} \quad \frac{7x = 875}{7 \quad 7} \quad \boxed{125 \text{ min.}}$$

5. While exercising, Julie found that her heart was beating 12 times every 5 seconds. How many times was it beating per 60 seconds?

$$\frac{12}{5} = \frac{x}{60} \quad \frac{5x = 720}{5 \quad 5} \quad x = 144 \quad \boxed{144 \text{ beats}}$$

6. There are 1,200 calories in 8 ounces of frosting, how many calories are in 5 ounces of frosting?

$$\frac{1,200}{8} = \frac{x}{5} \quad \frac{8x = 6000}{8 \quad 8} \quad x = 750 \quad \boxed{750 \text{ cal.}}$$

7. If a bunny can hop 12 feet in 8 seconds, how many seconds will it take the bunny to hop 180 feet.

$$\frac{12 \text{ ft}}{8 \text{ sec}} = \frac{180 \text{ ft}}{x \text{ sec}}$$

$$\frac{12x}{12} = \frac{1440}{12}$$

$$x = 120$$

120 sec.

9. Party Fizz Punch is made by mixing 4 parts fruit juice to 3 parts Sprite. Bill has 44 ounces of fruit juice. How much Sprite should he mix with it?

$$\frac{4 \text{ juice}}{3 \text{ sprite}} = \frac{44 \text{ juice}}{x \text{ sprite}}$$

$$\frac{4x}{4} = \frac{132}{4}$$

$$x = 33$$

33 oz.
Sprite

8. At a rock concert, the ratio of men to women is 6 to 2. If there are 1,500 men, how many women are there?

$$\frac{6 \text{ men}}{2 \text{ women}} = \frac{1500}{x}$$

$$\frac{6x}{6} = \frac{3000}{6}$$

$$x = 500$$

500 women

10. The money used in Jordan is called the Dinar. The exchange rate is \$3 to 2 Dinars. Find how many Dinar you would receive if you exchanged 36 dollars.

$$\frac{\$3}{2 \text{ Dinar}} = \frac{\$36}{x \text{ Dinar}}$$

$$\frac{3x}{2} = \frac{72}{2}$$

$$x = 24$$

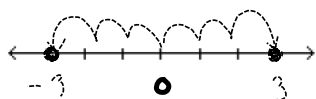
24 Dinar

back to page 34**Example 1: Solving an Absolute Value Equation**

Sometimes, we need to think **backwards**, and say what numbers are possible for x , when **given** the distance from zero.

a. $|x| = 3$

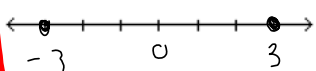
$x = -3$ or $x = 3$



Step 1 Think "3 way from 0"
Step 2 Give both possible answers

$$\begin{array}{rcl} 2|x| + 5 & = & 11 \\ -5 & & -5 \\ \hline 2|x| & = & 6 \\ \hline |x| & = & 3 \end{array}$$

$x = 3$ or $x = -3$



Step 1 ***** Isolate the abs. val.
Step 2 Think "3 way from zero"
Step 3 Give both possible answers.

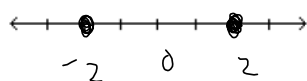
✓ Understanding Check

Solve and graph each equation and give a final answer:

a. $9|x| + 8 = 26$

$$\begin{array}{rcl} 9|x| & = & 18 \\ \hline |x| & = & 2 \end{array}$$

$x = 2$ or $x = -2$

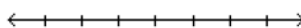


b. $-3|x| + 2 = -13$

$x = -5$ or $x = 5$

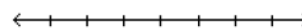
c. $8|x| - 6 = 2$

$x = 1$ or $x = -1$



d. $-|x| + 4 = -6$

$x = -10$ or $x = 10$



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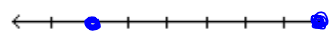
Example 2:

Solve each equation.

a. $|x - 4| = 3$

$x - 4 = 3$ or $x - 4 = -3$ or 1

$x = 7$ or $x = 1$



Step 1

Think "3 away from 0"

Step 2

Write both possible equations.

Step 3

Solve

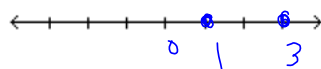
b. $|3x - 6| = 3$

$3x - 6 = -3$ or $3x - 6 = 3$

$3x = 3$

$3x = 9$

$x = 1$ or $x = 3$



Step 1

Step 2

Step 3

SAME

✓ Understanding Check

Solve each equation:

a. $|x + 6| = 8$

$$x = -14 \text{ or } x = 2$$

b. $|2x + 10| = 14$

$$x = 2 \text{ or } x = -12$$

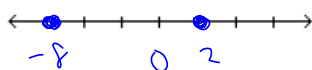
c. $|4x - 12| = 20$

Example 3:Solve each equation. *** DO NOT DISTRIBUTE!!!!**

a. $2|x + 3| - 7 = 3$

$2|x + 3| = 10$

$|x + 3| = 5$

Step 1 Isolate the Abs. Val.Step 2 SOLVEStep 3

$x + 3 = 5$ or $x + 3 = -5$

$x = 2$ or $x = -8$

✓ Understanding Check

Solve each equation:

a. $3|2x - 1| + 5 = 26$

$x = -3$ or $x = 4$

b. $-5|3x + 9| - 2 = -17$

$-5|3x + 9| = -15$

$|3x + 9| = 3$

$3x + 9 = 3$ or $3x + 9 = -3$

$3x = -6$

$3x = -12$

$x = -2$

or $x = -4$

Homework:

HW page 26 ALL