

## Solving Linear equations

$$A: \text{Solving } ax = b, \frac{x}{a} = b, \frac{a}{x} = b$$

## Steps:

1. Write both sides of the equation as fractions.
2. Cross multiply starting with "x".
3. Divide to solve for "x".

## Examples:

1. Solve.

a.  $4x = \frac{-10}{12}$

$$\frac{4x}{1} = \frac{-10}{12}$$

cross multiply

$$\frac{4x}{1} \times \frac{12}{12} = \frac{-10}{12}$$

$$48x = -10$$

Divide to solve for x.

$$\frac{48x}{48} = \frac{-10}{48}$$

48 cancels. Reduce!

$$x = \frac{-5}{24}$$

b.  $\frac{8}{3} = -2\frac{1}{4}x$

Write as improper fraction.

$$\frac{8}{3} = \frac{-9x}{4}$$

Cross Multiply

$$-27x = 32$$

Divide by -27 to solve for x.

$$\frac{-27x}{-27} = \frac{32}{-27}$$

Can't be reduced

$$x = -\frac{32}{27}$$

c.  $\frac{6}{5} = \frac{x}{4}$

Cross Multiply

$$\frac{6}{5} = \frac{x}{5}$$

Cross Multiply

$$5x = 30$$

Divide to solve for x

$$\frac{5x}{5} = \frac{30}{5}$$

$$x = 6$$

d.  $2\frac{2}{3}x = 2\frac{2}{6}$  Write as improper fractions.

$\frac{8x}{3} = \frac{14}{6}$  Cross Multiply

$\frac{8x}{3} \times \frac{6}{6} = \frac{14}{6} \times \frac{3}{3}$

$48x = 42$

$\frac{48x}{48} = \frac{42}{48}$  Divide to solve for x  
Reduce

$x = \frac{7}{8}$

2. Solve and check.

a.  $-11.2x = 7$  Divide to solve for x.

$\frac{-11.2x}{-11.2} = \frac{7}{-11.2}$

$x = -0.625$

Check: Substitute  $-0.625$  into the original equation.

$-11.2x = 7$   
 $-11.2(-0.625) = 7$  Multiply to solve.

$7 = 7$   $x = -0.625$  is correct.

b.  $-11 = 2.2x$  Write as fraction.

$\frac{-11}{1} = \frac{2.2}{x}$

$-11x = 2.2$  Divide to solve for x

$\frac{-11x}{-11} = \frac{2.2}{-11}$

$x = -0.2$

Check: Substitute  $-0.2$  into the original equation.

$-11 = 2.2x$   
 $-11 = 2.2(-0.2)$  Divide

$-11 = -11$   $x = -0.2$  is correct

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