2.2

## Multiplication Property of Equality

You can multiply both sides of an equation by any number (other than zero) without changing the solution.

ex. Notice $x=6$ is the solution to $\frac{1}{2}x=3$ multiplying both sides by 2 gives $x=6$.

Use this to find solutions.

ex. find solution to $\frac{1}{4}x=5$

$4(\frac{1}{4}x)=4(5)$

$\boxed{x=20}$

Check:

$\frac{1}{4}(20) \stackrel{?}{=} 5$

$5=5$ ✓

Can divide both sides too!

ex. Solve $2x=10$

$\frac{2x}{2}=\frac{10}{2}$

$\boxed{x=5}$

Check: $2(5) \stackrel{?}{=} 10$

$10=10$ ✓

## Coefficients of -1

What do we do if an equation has a $-x$ in it?

Remember that $-x$ is the same as $-1x$. Also remember that $(-1)(-1) = 1$

(ex) Solve $-x = 16/3$

multiply both sides by $-1$

$(-1)(-1x) = (-1)(16/3)$

$1x = -16/3$

$\boxed{x = -16/3}$

Check:

$-(-16/3) \stackrel{?}{=} 16/3$

$16/3 = 16/3$

Sometimes need to use both the addition/subtraction property AND the multiplication/division property.

In these cases

- use addition/subtraction property first (and get the "x-term" alone)
- then use multiplication/division property (to get the "x" alone)

(ex) $2x - 8 = 4$

$+8 \quad +8$

$\frac{2x}{2} = \frac{12}{2}$

$\boxed{x = 6}$

check: $2(6) - 8 \stackrel{?}{=} 4$

$12 - 8 \stackrel{?}{=} 4$

$4 = 4$ ✓

(ex) $-3y+5=7$

$-5 \quad -5$

$\frac{-3y}{-3} = \frac{2}{-3}$

$\boxed{y = -\frac{2}{3}}$

Check: $-3(-\frac{2}{3})+5 \stackrel{?}{=} 7$

$2+5 \stackrel{?}{=} 7$

$7 = 7$ ✓

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

$+2x \qquad +2x$

$-8 = 3x+4$

$-4 \qquad -4$

$\frac{-12}{3} = \frac{3x}{3}$

$\boxed{-4 = x}$

Check: $-2(-4)-8 \stackrel{?}{=} (-4)+4$

$8-8 \stackrel{?}{=} -4+4$

$0 = 0$ ✓