Get out your homework from yesterday and start checking your answers. After we check the homework we will take the Target Check.

# Classwork - One Step Equations w/ Rational Coeffiecents

Simplify each expression by creating an area model to distribute the number in front of the parentheses

A) $3(2x-5)$

$6x-15$

B) $-4(2x-8)$

$-8x+32$

C) $\frac{1}{2}(-6x+2)$

$-3x+1$

D) $-5(-a+6b)$

$5a-30b$

E) $2(3x+5)$

$6x+10$

F) $\frac{3}{4}(-4x-16)$

$-3x-12$

**Simplify the following expressions.**

G) $-3(2n+4)-2n$

$-6n-12-2n$

$-8n-12$

H) $2(-z+4)+6z$

$-2z+8+6z$

$4z+8$

I) $6+7(2x-2)$

$6+14x-14$

$14x-8$

J) $\frac{1}{2}(-10x+6)+4x$

$-5x+3+4x$

$-1x+3$

K) $-(3x-2)+4$ $-1(3x-2)$

$-3x+2+4$

$-3x+6$

L) $2a-6(a-2)$

$2a-6a+12$

$-4a+12$

Simplify each expression to decide whether the 2 expressions are equivalent or not. Show work to prove your answer. *Equivalent expressions have the same simplified expression after you combine like terms.*

M)

**Expression #1**

$-6x + 9 + 3x - 2$

$-3x + 7$

**(Circle Your Answer)**

Equivalent

Not Equivalent

**Expression #2**

$-3(x - 4) + 5$

$-3x + 12 + 5$

$-3x + 17$

N)

**Expression #1**

$x + 6 - 5x - 7$

$-4x - 1$

**(Circle Your Answer)**

Equivalent

Not Equivalent

**Expression #2**

$-4(2x + 2) + 4x + 7$

$-8x - 8 + 4x + 7$

$-4x - 1$

On your own piece of paper, solve the following equations below using correct inverse operations.

Solve the following one-step equations. Make sure to show inverse operations on BOTH sides and WORK DOWN. SHOW ALL WORK. Guess and Check is not a method to use anymore.

**Example:** $x + 5 = -4$

$x + 5 = -4$

$-5 \quad -5$

$\boxed{x = -9}$

**Check Your Work!**
Put your solution into the original equation to check if the left side of the equation is equal to the right side of the equation.

→→→

**Example**

$x = -9$

$(-9) + 5 = -4$

$-4 = -4$

$x = -9$ is correct

A) $x + 6 = 5$

$-6 \quad -6$

$x = -1$

$-1 + 6 = 5$

$5 = 5$ ✓

B) $\frac{x}{10} = 4$ • 10

$x = 40$

C) $2x = 30$

$\frac{2x}{2} = \frac{30}{2}$

$x = 15$

D) $x - 12 = -4$

$+12 \quad +12$

$x = 8$

E) $7x = -49$

$\frac{7x}{7} = \frac{-49}{7}$

$x = -7$

F) $b - 18 = 13$

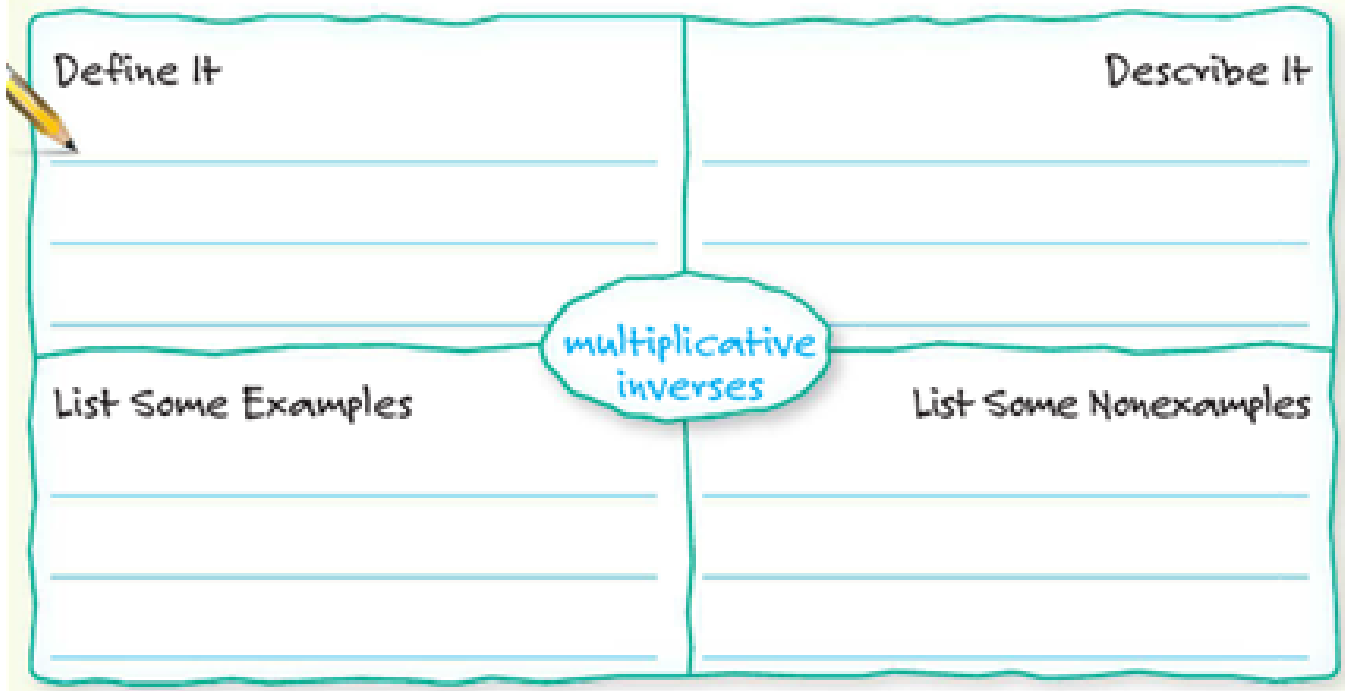
$+18 \quad +18$

$b = 31$

# Vocabulary Start-Up

Two numbers with a product of 1, such as $\frac{3}{4}$ and $\frac{4}{3}$, are called reciprocals or **multiplicative inverses**.

**Complete the graphic organizer.**

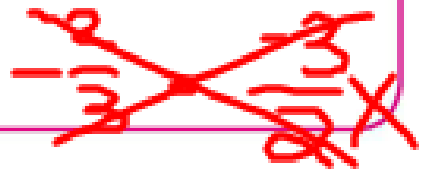



Describe how a multiplicative inverse is used in division of fractions.

# Inverse Property of Multiplication

p. 112

| | |
|---|---|
| **Words** | The product of a number and its multiplicative inverse is 1. |
| **Numbers** | $\frac{7}{8} \times \frac{8}{7} = 1$ $\quad -\frac{3}{2} \times -\frac{2}{3} = 1$ |
| **Symbols** | $\frac{a}{b} \cdot \frac{b}{a} = 1$, where $a$ and $b \neq 0$ |



The numerical factor of a term that contains a variable is called the **coefficient** of the variable.

1x

coefficient → 3x ← variable

In the equation $\frac{3}{4}c = 18$, the coefficient of $c$ is a rational number. To solve an equation when the coefficient is a fraction, multiply each side by the multiplicative inverse of the fraction.

## Example

**1.** Solve $\frac{3}{4}c = 18$. Check your solution.

| | |
|---|---|
| $\frac{3}{4}c = 18$ | Write the equation. |
| $\left(\frac{4}{3}\right) \cdot \frac{3}{4}c = \left(\frac{4}{3}\right) \cdot 18$ | Multiply each side by the multiplicative inverse of $\frac{3}{4}$, $\frac{4}{3}$. |
| $\frac{4}{3} \cdot \frac{3}{4}c = \frac{4}{3} \cdot \frac{18}{1}$ | Write 18 as $\frac{18}{1}$. Divide by common factors. |
| $c = 24$ | Simplify. |
| **Check** $\frac{3}{4}c = 18$ | Write the original equation. |
| $\frac{3}{4}(24) \stackrel{?}{=} 18$ | Replace $c$ with 24. |
| $\frac{3}{4}\left(\frac{24}{1}\right) \stackrel{?}{=} 18$ | Write 24 as $\frac{24}{1}$. Divide by common factors. |
| $18 = 18$ ✓ | This sentence is true. |

$\frac{3}{4}c = 18$ $\div \frac{3}{4}$ $\div \frac{3}{4}$

$\frac{3}{4}c \Rightarrow \frac{3c}{4}$

$\frac{3c}{4} = 18 \cdot 4$

$3c = 72$

$\frac{3c}{3} = \frac{72}{3}$ $c = 24$

**Got it?** Do these problems to find out.

a. $\frac{1}{5}x = 12$

b. $-\frac{2}{9}d = 4$

c. $15 = \frac{5}{3}n$

d. $-24 = -\frac{6}{7}p$

A) $\frac{1}{5}x = 12$

$5 \cdot \frac{1x}{5} = 12 \cdot 5$

$1x = 60$

B) $\frac{-2}{2} \cdot \frac{2}{2} d = 40 - \frac{9}{2}$

$d = -18$

C) $15 = \frac{5}{3}n$

$3 \cdot 15 = \frac{5n}{3} \cdot 3$

$\frac{45}{5} = \frac{5n}{5}$

$9 = n$

D) $-\frac{7}{6} \cdot -24 = -\frac{6}{7}p \cdot -\frac{7}{6}$

$28 = p$

## Example

**2.** Solve $1\frac{1}{2}s = 16\frac{1}{2}$. Check your solution.

| | |
|---|---|
| $1\frac{1}{2}s = 16\frac{1}{2}$ | Write the equation. |
| $\frac{3}{2}s = \frac{33}{2}$ | Rename $1\frac{1}{2}$ as $\frac{3}{2}$ and $16\frac{1}{2}$ as $\frac{33}{2}$. |
| $\left(\frac{2}{3}\right) \cdot \frac{3}{2}s = \left(\frac{2}{3}\right) \cdot \frac{33}{2}$ | Multiply each side by the multiplicative inverse of $\frac{3}{2}$, $\frac{2}{3}$. |
| $\frac{\cancel{2}^{1}}{\cancel{3}_{1}} \cdot \frac{\cancel{3}^{1}}{\cancel{2}_{1}}s = \frac{\cancel{2}^{1}}{\cancel{3}_{1}} \cdot \frac{\cancel{33}^{11}}{\cancel{2}_{1}}$ | Divide by common factors. |
| $s = 11$ | Simplify. |

D) $4\frac{1}{6} = 3\frac{1}{3}c$

$\frac{25}{6} = \frac{10}{3}c$

$\frac{\cancel{25}^{5}}{\cancel{6}_{2}} \cdot \frac{\cancel{3}^{1}}{\cancel{10}_{2}} = \frac{\cancel{10}^{1}}{\cancel{3}_{1}}c \cdot \frac{3}{\cancel{10}_{2}}$

$\frac{5}{4} = c$

$1\frac{1}{4} = c$

**Got it?** Do these problems to find out.

d. $4\frac{1}{6} = 3\frac{1}{3}c$

e. $-9\frac{5}{8}w = 108$

f. $1\frac{7}{8}y = 4\frac{1}{2}$

# Solve Equations with Decimal Coefficients

In the equation $3.15 = 0.45n$ the coefficient of $n$ is a decimal. To solve an equation with a decimal coefficient, divide each side of the equation by the coefficient.

## Example

Tutor

**3.** **Solve $3.15 = 0.45n$. Check your solution.**

$$3.15 = 0.45n$$ Write the equation.

$$\frac{3.15}{0.45} = \frac{0.45n}{0.45}$$ Division Property of Equality

$$7 = n$$ Simplify.

Check $3.15 = 0.45n$ Write the original equation.

$3.15 = 0.45(7)$ Replace $n$ with 7.

$3.15 = 3.15$ ✓ The sentence is true.

**Got it?** **Do these problems to find out.**

**g.** $4.9 = 0.7t$


**h.** $-1.4m = 2.1$

**i.** $-5.6k = -12.88$