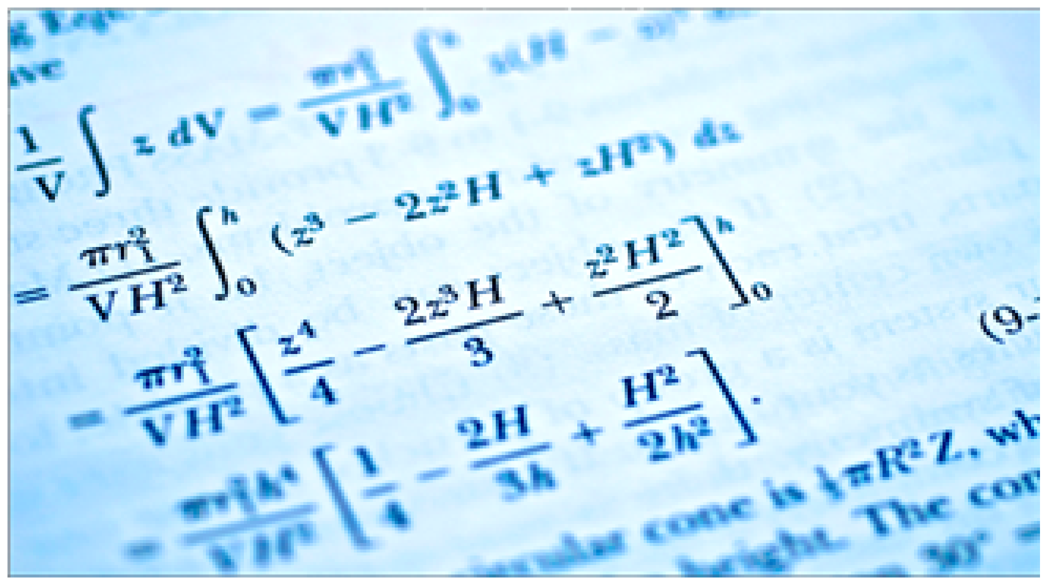
Warm UP

Simplify 2(7x - 2y) + 6x - 7(x - 3y)

a. 8x - y
b. 8x - 17y
c. 13x +25y
d. 13x +17y

Solving Literal Equations



Goals aligned to common core standards:

- You will solve equations to highlight a quantity of interest.

- You will justify each step in solving an equation.

Things to remember...

When you solve for a variable, you isolate it.

You will combine only the terms that are like terms.

These problems can "look" messy because sometimes, nothing combines.

Example: $3x - 4y = 7$ for y

Think, we are trying to get *y* all by itself

$$\begin{aligned} 3x - 4y &= 7 \\ -3x \qquad &\quad -3x \\ \hline -4y &= 7 - 3x \end{aligned}$$

$$\frac{-4y}{-4} = \frac{7-3x}{-4}$$

$$y = \frac{7-3x}{-4}$$

Example: $C = 2\pi r$ for r

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$\frac{C}{2\pi} = r$$

The largest yo-yo in the world is 32.7 feet in circumference. It was launched by crane from a height of 189 feet.

Find the radius of the yo-yo.

$C = 32.7$

$$\frac{32.7}{2\pi} = 51.37 = r$$

The Pythagorean Theorem expresses the relation between the legs a and b of a right triangle and its hypotenuse c with the equation $a^2 + b^2 = c^2$.

Why might the theorem need to be solved for c?

$$\sqrt{a^2 + b^2} = \sqrt{c^2}$$

$$\boxed{\begin{gathered}\sqrt{a^2+b^2} = c \\ \text{or} \\ a+b=c\end{gathered}}$$

Motion can be described by the formula below, where t = time elapsed, u = initial velocity, a = acceleration, and s = distance traveled. Rewrite the equation in terms of the acceleration.

$$s = ut + (1/2)at^2$$

$$-ut \quad -ut$$

$$2(s - ut) = \cancel{1/2}at^2 \cdot \cancel{2}$$

$$\frac{2s - 2ut}{t^2} = \frac{at^2}{t^2}$$

$$\boxed{a = \frac{2s - 2ut}{t^2}}$$

Rewrite the equation in terms of the initial velocity.

$$s = ut + (1/2)at^2$$

$$-\tfrac{1}{2}at^2 \qquad -(1/2)at^2$$

$$\frac{s - \frac{1}{2}at^2}{t} = \frac{ut}{t}$$

$$\boxed{\frac{s - \frac{1}{2}at^2}{t} = u}$$

Explain why the equation (x/2) + (7/3) = 5 has the same solution as the equation 3x + 14 = 30. Does this mean that (x/2) + (7/3) is equal to 3x + 14?

$$\frac{x}{2} + \frac{7}{3} = 5$$

$$-\frac{7}{3} \quad -\frac{7}{3}$$

$$2 \cdot \frac{x}{\cancel{2}} = \frac{8}{3} \cdot 2$$

$$\boxed{x = \frac{16}{3}}$$

$$3x + 14 = 30$$

$$-14 \quad -14$$

$$\frac{3x}{3} = \frac{16}{3}$$

$$\boxed{x = \frac{16}{3}}$$

$$\boxed{\text{No, b|c } 30 \neq 5}$$

Can 3n + 2 = n - 10 be solved in multiple ways?

Provide examples of how this equation might be solved in different ways and explain each step.

$$3n + \cancel{2} = n - 10$$
$$\quad \cancel{-2} \qquad -2$$

$$3n = n - 12$$
$$-n \quad -n$$

$$\frac{2n}{2} = \frac{-12}{2}$$

$$\boxed{n = -6}$$

$$\cancel{3n} + 2 = n - 10$$
$$\cancel{-3n} \qquad -3n$$

$$2 = -2n \cancel{-10}$$
$$+10 \qquad \cancel{+10}$$

$$\frac{12}{-2} = \frac{-2n}{-2}$$

$$\boxed{-6 = n}$$

Example: $2 \cdot s = \frac{1}{2}at^2 \cdot 2$ for a

$$\frac{2s}{t^2} = \frac{at^2}{t^2}$$

$$\boxed{\frac{2s}{t^2} = a}$$

Example: $3 \cdot \frac{y + a}{\cancel{3}} = c \cdot 3$ for y

$$y + a = 3c$$

$$-a \qquad -a$$

$$\boxed{y = 3c - a}$$

Example: $p = a(b + c)$ for a

$$\frac{p}{(b+c)} = \frac{a(b+c)}{(b+c)}$$

$$\boxed{\frac{p}{(b+c)} = a}$$

Example: $mw - x = 2w + 5$ for w

Homework!

Book page 128 problems 1 - 4 and 8 - 11