

Homework Qs

Note Title

1/25/2017

1.6 #123

$$6 + 2[-8 - 3(2x + 4)] + 10x$$

$$6 + 2[-8 - 6x - 12] + 10x$$

$$6 + 2[-6x - 20] + 10x$$

$$6 - 12x - 40 + 10x$$

$$\boxed{-34 - 2x}$$

same as $\boxed{-2x - 34}$

Connect Math

2.1 #4

$$-\frac{1}{5} - 4g = 4$$

2.1: Addition, subtraction, multiplication, and Division

Properties of Equality

An equation is a statement that two values are equal.

It has an equals sign.

A solution for the equation is a value that makes the equation true.

To solve an equation means to find the solutions.

Example: Is 3 a solution of $2y - 5 = 11$?

$$\text{Substitute } y=3: 2(3) - 5 = 11$$

$$6 - 5 = 11$$

$$1 = 11 \text{ False!}$$

No, 3 is not a solution.

Is 8 a solution?

$$\text{Substitute } y=8: 2(8) - 5 = 11$$

$$16 - 5 = 11$$

$$11 = 11 \text{ true!}$$

Yes, 8 is a solution.

Addition (and subtraction) property of equality

$$\text{If } a = b, \text{ then } a + c = b + c$$

This means we can add (or subtract) the same quantity on both sides.

Ex.: Solve.

$$x - 7 = 15$$

+7 +7

$$x + 0 = 22$$

$$x = 22$$

Solution Set:

$$\{22\}$$

Ex.: Solve

$$x + \frac{1}{8} = \frac{5}{8}$$

$-\frac{1}{8}$ $-\frac{1}{8}$

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

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

Sol'n set:

$$\{\frac{1}{2}\}$$

Multiplication Property of Equality

If $a = b$, then $ac = bc$ for $c \neq 0$. ↖ not equal to

This means we can multiply (or divide) both sides by the same nonzero number.

So, we also have: if $a = b$, then $\frac{a}{c} = \frac{b}{c}$.

for $c \neq 0$

Example: Solve.

$$9x = 45$$

$$\frac{9x}{9} = \frac{45}{9}$$

$$x = 5$$

Sol'n set: $\{5\}$

Ex.: Solve

$$-8x = 24$$

$$\frac{-8x}{-8} = \frac{24}{-8}$$

$$x = -3$$

Sol'n set:

$$\{-3\}$$

Ex: Solve.

$$-\frac{2}{3}y = 7$$

$$\frac{-\frac{2}{3}y}{-\frac{2}{3}} = \frac{7}{-\frac{2}{3}}$$

$$\left(-\frac{3}{2}\right)\left(-\frac{2}{3}y\right) = \frac{7}{1}\left(-\frac{3}{2}\right)$$

$$\frac{6}{6}y = -\frac{21}{2}$$

$$1y = -\frac{21}{2}$$

$$y = -\frac{21}{2}$$

Recall

Dividing by a number
is the same as
multiplying by its reciprocal.

Solution Set:

$$\left\{-\frac{21}{2}\right\}$$

Ex:

Solve.

$$-\frac{4}{3}x = -\frac{5}{7}$$

$$\left(-\frac{3}{4}\right)\left(-\frac{4}{3}x\right) = \left(-\frac{5}{7}\right)\left(-\frac{3}{4}\right)$$

$$x = +\frac{15}{28}$$

Sol'n Set:

$$\left\{\frac{15}{28}\right\}$$

Ex:

$$0.35x = 8.25$$

$$\frac{0.35x}{0.35} = \frac{8.25}{0.35}$$

$$x = \frac{8.25}{0.35} \left(\frac{100}{100}\right)$$

$$x = \frac{825 \div 5}{35 \div 5}$$

$$x = \frac{165}{7}$$

$$\left\{\frac{165}{7}\right\}$$

$$\begin{array}{r} 165 \\ 5 \overline{) 825} \\ \underline{5} \\ 32 \\ \underline{30} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

2.2: Solving Linear Equations

A linear equation has the variable to the 1st power only. (can be rearranged to get $ax+b=c$ or similar)

Equivalent equations have the same solution set.

When solving an equation that requires several steps, each line should be equivalent to the original equation (and to all the other steps).

Reminder: Expressions get simplified.
Equations get solved.

Example:

Solve.

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

$$-5 - 2y + 10 = 4y - 2y - 8 - 3$$

$$\begin{array}{rcl} -2y + 5 & = & 2y - 11 \\ -2y & & -2y \end{array}$$

$$\begin{array}{rcl} -4y + 5 & = & -11 \\ -5 & & -5 \end{array}$$

$$-4y = -16$$

$$\frac{-4y}{-4} = \frac{-16}{-4}$$

$$y = 4$$

Sol'n Set: $\boxed{\{4\}}$

Example: Solve.

$$4x - \frac{3}{5} = \frac{1}{3}x + \frac{1}{2}$$

$$4x - \frac{1}{3}x = \frac{1}{2} + \frac{3}{5}$$

$$\left(\frac{3}{3}\right) 4x - \frac{1}{3}x = \frac{1}{2}\left(\frac{5}{5}\right) + \frac{3}{5}\left(\frac{2}{2}\right)$$

$$\frac{12}{3}x - \frac{1}{3}x = \frac{5}{10} + \frac{6}{10}$$

$$\frac{11}{3}x = \frac{11}{10}$$

$$\frac{3}{11}\left(\frac{11}{3}x\right) = \left(\frac{11}{10}\right)\left(\frac{3}{11}\right)$$

$$x = \frac{33}{110} \div 11$$

$$x = \frac{3}{10}$$

$$4x - \frac{3}{5} = \frac{1}{3}x + \frac{1}{2}$$
$$-\frac{1}{3}x + \frac{3}{5} \quad -\frac{1}{3}x + \frac{3}{5}$$

Example: Solve.

$$-\frac{1}{2}(6-5x) = \frac{2}{3}\left(\frac{3}{4} + 10x\right)$$

$$-\frac{1}{2}(6) - \frac{1}{2}(-5x) = \frac{2}{3}\left(\frac{3}{4}\right) + \frac{2}{3}(10x)$$

$$-\frac{6}{2} + \frac{5}{2}x = \frac{6}{12} + \frac{20}{3}x$$

$$\frac{5}{2}x - \frac{20}{3}x = \frac{6}{12} + \frac{6}{2}$$

$$\frac{5}{2}x - \frac{20}{3}x = \frac{1}{2} + \frac{3}{1}$$

$$\frac{3}{3}\left(\frac{5}{2}x\right) - \frac{20}{3}x\left(\frac{2}{2}\right) = \frac{1}{2} + \frac{3}{1}\left(\frac{2}{2}\right)$$

$$\frac{15}{6}x - \frac{40}{6}x = \frac{1}{2} + \frac{6}{2}$$

$$-\frac{25}{6}x = \frac{7}{2}$$

$$-\frac{6}{25}\left(-\frac{25}{6}x\right) = \frac{7}{2}\left(-\frac{6}{25}\right)$$

$$x = -\frac{42}{150}$$

$$x = -\frac{7}{25}$$

