What you will learn about:
Solving Equations Using Addition and Subtraction Properties

Solution to Equation

Value that make equation true.

Determine whether a number is a solution to equation

Step 1 – Substitute the number in for the variable (5)

Step 2 – Simplify the expressions on both sides of the equation

Step 3 – Determine whether the resulting equation is true (Left side is equal to the Right side)

If true, the number is a solution
If false the number is not a solution

Determine whether

$x = \frac{3}{2}$ *is a solution of* $4x - 2 = 2x + 1$

Solution

$4(\frac{3}{2}) - 2 = 2(\frac{3}{2}) + 1$

$6 - 2 = 3 + 1$

$4 = 4$

Is $y = \frac{7}{5}$ *a solution of* $5y + 3 = 10y - 4$

Solution

$5(\frac{7}{5}) + 3 \stackrel{?}{=} 10(\frac{7}{5}) - 4$

$7 + 3 \quad 14 - 4$

$10 = 10$

Subtraction Property of Equality

$a = b$

$a - c = b - c$

Solve:

$y + 37 = -13$

$-37 \quad -37$

$y = -50$

$x + 19 = 8$

$-19 \quad -19$

$x = -11$

Addition Property of Equality

$a = b$

$a + c = b + c$

Solve:

$a - 28 = -37$

$+28 \quad +28$

$a = -9$

$n - 61 = -55$

$+61 \quad +61$

$n = 6$

$\frac{6}{8} + \frac{5}{8} = \frac{11}{8}$

$x - \frac{5}{8} = \frac{3}{4} + \frac{5}{8}$

$+\frac{5}{8}$

$x = \frac{11}{8}$

$p - \frac{2}{3} = -\frac{5}{6} + \frac{2}{3}$

$+\frac{2}{3}$

$p = -\frac{1}{6}$

$-\frac{5}{6} + \frac{4}{6}$

-4.20

$.63$

-3.57

$n - 0.63 = -4.2$

$+0.63 \quad +0.63$

$n = -3.57$

$b - 0.47 = 1.23$

$+ .47 \quad .47$

$b = 1.70$

Solving Equations that require Simplification

$(9x - 5 - 8x - 6) = 7$

$x - 11 = 7$

$x = 18$

$(8y - 4 - 7y - 7) = -4$

$y - 11 = -4$

$y = 7$

$5(x - 4) - 4x = -8$

$5x - 20 - 4x = -8$

$x - 20 = -8$

$+20 \quad +20$

$x = 12$

$5(p - 3) - 4p = -5$

$5p - 15 - 4p = -5$

$p - 15 = -5$

$p = 10$

$3(2y - 1) - 5y = 2(y + 1) - 2(y + 3)$

$6y - 3 - 5y = 2y + 2 - 2y - 6$

$y - 3 = -4$

$y = -1$

	$4(2h-3)-7h=6(h-2)-6(h-1)$ $8h-12-7h=6h-12-6h+6$ $h-12=-6$ $h=6$
Translate to an equation and Solve	Step 1 – Locate the "equal" words translate into = sign Step 2 – Translate words to the left of equals into an Algebraic Expression Step 3 – Translate words to the Right of equals into an Algebraic Expression
	Translate and Solve: Eleven more than x is equal to 54. $x+11=54$ (−11 −11) $x=43$
	Translate and Solve: Ten more than x is equal to 41. $x+10=41$ $x=31$
	Translate and Solve: Twelve less than x is equal to 51. $x-12=51$ $x=63$
	Translate and Solve: The difference of 12t and 11t is -14. $12t-11t=-14$ $t=-14$

	The MacIntyre family recycled newspapers for two months. The two months of newspapers weighed a total of 57 pounds. The second month, the newspaper weighed 28 pounds. How much did the newspaper weigh in the first month? $X + 28 = 57$ $-28 \quad -28$ $X = 29$ lbs Randell paid $28,675 for his new car. This was $875 less than the sticker price. What was the sticker price of the car? $X - 875 = 28{,}675$ $+875 \quad +875$ $X = \$29{,}550$ The admission price for the movies during the day is $7.75. This is $3.25 less the price at night. How much does the movie cost at night? $X - 3.25 = 7.75$ $+3.25$ $X = \$11.00$

What you will learn about:
Solving Equations Using Division and Multiplication Properties

Division Property of Equality

$a = b$

$\frac{a}{c} = \frac{b}{c}$

Multiplication Property of Equality

$a = b$

$ac = bc$

Solve:

$\frac{5x}{5} = \frac{-27}{5}$

$x = -\frac{27}{5}$

$\frac{4z}{4} = \frac{-55}{4}$

$z = -\frac{55}{4}$

$(-7)\left(\frac{y}{-7}\right) = (-8)(-7)$

$y = 56$

$(-6)\left(\frac{b}{-6}\right) = (-24)(-6)$

$b = 144$

$4\left(\frac{3}{4}x\right) = (12)(4)$

$\frac{3x}{3} = \frac{48}{3}$

$x = 16$

$\left(\frac{4}{3}\right)\left(\frac{3}{4}x\right) = (12)\left(\frac{4}{3}\right)$

$x = 16$

$\left(\frac{6}{5}\right)\left(\frac{5}{6}y\right) = (15)\left(\frac{6}{5}\right)$

$y = 18$

$5\left(\frac{8}{15}\right) = \left(-\frac{4}{5}x\right)(5)$

$\frac{40}{15} = -4x$

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

$3\left(\frac{5}{6}\right) = \left(-\frac{8}{3}r\right)(3)$

$\frac{15}{6} = -8r$

$14 - 23 = 12y - 4y - 5y$

$-9 = 3y$

$y = -3$

$-4(a - 3) - 7 = 25$

$-4a + 12 - 7 = 25$

$-4a + 5 = 25$

$-4a = 20$

$a = -5$

$-6(r-2)-12=30$

$-6r+12-12=30$

$-6r=30$

$r=-5$

$$\begin{array}{r} 13 \\ 11\overline{)143} \\ \underline{11} \\ 33 \end{array}$$

Translate and Solve:

The number 143 is the product of -11 and y.

$143=-11y$

$y=-13$

n divided by 8 is -32.

$$\begin{array}{r} 1 \\ -32 \\ \times\ 8 \\ \hline -256 \end{array}$$

$8\left(\frac{n}{8}\right)=(-32)(8)$

$n=-256$

The quotient of y and -4 is 68.

$$\begin{array}{r} 3 \\ 68 \\ \times\ 4 \\ \hline -272 \end{array}$$

$(-4)\left(\frac{y}{-4}\right)=(68)(-4)$

$y=-272$

Three-fourths of p is 18.

$\left(\frac{4}{3}\right)\left(\frac{3}{4}p\right)=(18)\left(\frac{4}{3}\right)$

$p=24$

The sum of three-eighths and x is one-half.

$x+\frac{3}{8}=\frac{1}{2}$

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

$=\frac{1}{8}$

$$\begin{array}{r} 1.79 \\ 6\overline{)10.74} \\ \underline{6} \\ 47 \\ \underline{42} \\ 54 \end{array}$$

Denae bought 6 pounds of grapes for \$10.74. What was the cost of one pound of grapes?

$6p = 10.74$

$\frac{10.74}{6} = p$

$p = \$1.79/lb$

$$\begin{array}{r} 5.83 \\ 4\overline{)34.98} \\ \underline{30} \\ 49 \\ \underline{48} \\ 18 \end{array}$$

At JB's Bowling Alley, 6 people can play on one lane for \$34.98. What is the cost for each person?

$6c = 34.98$

$c = \frac{34.98}{6}$

$C = \$5.83/person$

Andreas bought a used car for \$12,000. Because the car was 4 years old, the price was $\frac{3}{4}$ of the original price, when the car was new. What was the original price of the car?

$\left(\frac{4}{3}\right)\left(\frac{3}{4}\right)p = (12{,}000)\left(\frac{4}{3}\right)$

$p = \$16{,}000$

$$\begin{array}{r} 120000 \\ 15\overline{)1{,}800{,}000} \\ \underline{15} \\ 30 \\ 30 \end{array}$$

The annual property tax on the Mehta's house is \$1,800, calculated as $\frac{15}{1{,}000}$ of the assessed value of the house. What is the assessed value of the Mehta's house?

$1000\left(\frac{15}{1000} \cdot x\right) = (1800)(1000$

$15x = 1{,}800{,}000$

$x = \$120{,}000$

Stella planted 14 flats of flowers in $\frac{2}{3}$ of her garden. How many flats of flowers would she need to fill the the whole garden?

$\frac{3}{2}\left(\frac{2}{3}\right)x = (14)\frac{3}{2}$

$x = 21$ flats