

2-Step Equations 2/5

$2x + 3 = 15$
 $\frac{x}{2} - 3 = 5$

<p>1st Move the constant (Add/Subtract)</p> $\begin{array}{r} 2x + 3 = 15 \\ -3 \quad -3 \\ \hline 2x = 12 \end{array}$ $\begin{array}{r} \frac{x}{2} - 3 = 5 \\ +3 \quad +3 \\ \hline \frac{x}{2} = 8 \end{array}$	<p>2nd Divide by the Coefficient</p> $\frac{2x = 12}{2 \quad 2}$ $\boxed{x = 6}$ <p style="text-align: center;">-- OR --</p> <p>Multiply by the denominator</p> $2 \cdot \frac{x}{2} = 8 \cdot 2$ $\boxed{x = 16}$
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Why are those my answers?

Check:

$2x + 3 = 15 \quad (x=6)$ $2(6) + 3 = 15$ $12 + 3 = 15$ $15 = 15 \checkmark$	$\frac{x}{2} - 3 = 5 \quad (x=16)$ $\frac{16}{2} - 3 = 5$ $8 - 3 = 5$ $5 = 5 \checkmark$
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Practice

① $5x + 9 = 24$ ①

$-9 \quad -9$ ②

$5x = 15$ ③

$\frac{5x}{5} = \frac{15}{5}$ ④

$\boxed{x = 3}$ ⑤

② $\frac{a}{3} + 4 = -2$

$-4 \quad -4$

$3 \cdot \frac{a}{3} = -6 \cdot 3$

$\boxed{a = -18}$

$$\begin{array}{r} \textcircled{3} \quad \cancel{3} - 2x = 15 \\ \underline{-3 \quad | \quad -3} \\ -2x = 12 \\ \underline{-2 \quad | \quad -2} \\ x = -6 \end{array}$$

$$\begin{array}{r} \textcircled{4} \quad -12 = 2x - \cancel{5} \\ \underline{+5 \quad | \quad +5} \\ -7 = 2x \\ \underline{2 \quad | \quad 2} \\ x = -3.5 \end{array}$$

on own

$$\begin{array}{r} \textcircled{1} \quad -2x - \cancel{3} = 13 \\ \underline{+3 \quad | \quad +3} \\ -2x = 16 \\ \underline{-2 \quad | \quad -2} \\ x = -8 \end{array}$$

$$\begin{array}{r} \textcircled{2} \quad \frac{x}{4} + \cancel{9} = 7 \\ \underline{-9 \quad | \quad -9} \\ 4 \cdot \frac{x}{4} = -2 \cdot 4 \\ x = -8 \end{array}$$

Practice

$$\textcircled{1} \begin{array}{r} 5n - 10 = -30 \\ +10 \quad +10 \\ \hline 5n = -20 \\ \frac{5n}{5} = \frac{-20}{5} \\ n = -4 \end{array}$$

$$\textcircled{2} \begin{array}{l} 5(n-2) = -30 \\ 5n - 10 = -30 \end{array}$$

* If you have the distributive property, You MUST do that first.

~~$$\frac{5(n-2)}{5} = \frac{-30}{5}$$~~

$$\begin{array}{r} n - 2 = -6 \\ +2 \quad +2 \\ \hline \end{array}$$

$$\boxed{n = -4}$$

$$n = -4$$

$$\textcircled{3} \quad 49 = -7(6+W)$$

$$49 = -42 - 7W$$

$$+42 \quad | \quad +42$$

$$91 = -7W$$

$$\frac{-91}{-7} = \frac{-7W}{-7}$$

$$\boxed{-13 = W}$$

$$\boxed{W = -13}$$

$$\textcircled{4} \quad 4 + \frac{1}{5}b = -1$$

$$-4 \quad | \quad -4$$

$$\frac{1}{5}b = -5$$

$$-5 \div \frac{1}{5}$$

$$-5 \cdot 5$$

$$\boxed{b = -25}$$

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

$$+3 \quad | \quad +3$$

$$4 \cdot \frac{x}{4} = 1 + 4$$

$$\boxed{x = 4}$$

$$\textcircled{6} \quad -2 + \frac{2}{3}w = 10$$

$$+2 \quad | \quad +2$$

$$\frac{2}{3}w = 12$$

$$\frac{\frac{2}{3}w}{\frac{2}{3}} = \frac{12}{\frac{2}{3}}$$

$$w = 18$$

$$\textcircled{7} \quad -2(x-4) = -4$$

$$-2x + 8 = -4$$

$$-8 \quad | \quad -8$$

$$\underline{-2x - 12} \quad x = 6$$

2-step Equation Word Problems

2/7

* Variable Key Words *

{ - Per
- Each

- Every

- a/an * Not as Common

* Identify your Constant and total
(What's it equal?)

* Don't forget to label

1. Tim spent half of his allowance going to the movies. He washed the family car and earned nine dollars. What is his weekly allowance if he ended with twelve dollars?

Constant: 9Variable: $x/2$ Total: 12

$$\frac{x}{2} + 9 = 12$$

$$\begin{array}{r} \frac{x}{2} + 9 = 12 \\ -9 \quad | \quad -9 \\ \hline \frac{x}{2} = 3 \end{array}$$

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

$$x = \$6$$

2. Oceanside Bike Rental Shop charges 11 dollars plus 6 dollars an hour for renting a bike. Tom paid 65 dollars to rent a bike. How many hours did he pay to have the bike checked out?

Constant: 11Variable: $6x$ Total: 65

$$6x + 11 = 65$$

$$\begin{array}{r} 6x + 11 = 65 \\ -11 \quad | \quad -11 \\ \hline 6x = 54 \\ \frac{6}{6} \quad \frac{54}{6} \end{array}$$

$$x = 9 \text{ hours}$$

3. Sam bought a soft drink for two dollars and eight candy bars. He spent a total of eighteen dollars. How much did each candy bar cost?

Constant: 2
 Variable: 8x
 Total: 18

$$\begin{array}{r} 8x + 2 = 18 \\ - 2 \quad - 2 \\ \hline 8x = 16 \\ \frac{8}{8} \quad \frac{8}{8} \end{array}$$

$x = \$2$

4. Hermione's Bikes rents bikes for \$10 plus \$4 per hour. Janice paid \$30 to rent a bike. How many hours did she rent the bike?

Constant: 10
 Variable: 4x
 Total: 30

$$\begin{array}{r} 4x + 10 = 30 \\ - 10 \quad - 10 \\ \hline 4x = 20 \\ \frac{4}{4} \quad \frac{4}{4} \end{array}$$

$4x = 20$
 $\frac{4x}{4} = \frac{20}{4}$

$x = 5 \text{ hours}$

5. Danielle spent \$35 on a magazine and some notepads. If the magazine cost \$3 and each notepad cost \$4 then how many notepads did she buy?

Constant: 3
 Variable: 4x
 Total: 35

$$\begin{array}{r} 4x + 3 = 35 \\ - 3 \quad - 3 \\ \hline 4x = 32 \\ \frac{4}{4} \quad \frac{4}{4} \end{array}$$

$x = 8 \text{ notepads}$

1. It costs \$12 to attend a golf clinic with a local pro. Buckets of balls for practice during the clinic cost \$3 each. How many buckets can you buy at the clinic if you have \$30 to spend?

Constant: 12
 Variable: 3x
 Total: 30

$$\begin{array}{r} 12 + 3x = 30 \\ - 12 \quad - 12 \\ \hline 3x = 18 \\ \frac{3}{3} \quad \frac{3}{3} \end{array}$$

$x = 6 \text{ buckets}$

2. Paulo has \$145 in his savings account. He earns \$36 a week mowing lawns. If Paulo saves all of his earnings, after how many weeks will he have \$433 saved?

Constant: 145
 Variable: 36x
 Total: 433

$$\begin{array}{r} 145 + 36x = 433 \\ - 145 \quad - 145 \\ \hline 36x = 288 \\ \frac{36}{36} \quad \frac{36}{36} \end{array}$$

$x = 8 \text{ weeks}$

<p>3. An online retailer charges \$6.99 plus \$0.55 per pound to ship electronics purchases. How many pounds is a DVD player for which the shipping charge is \$11.94?</p> <p>Constant: <u>6.99</u> $6.99 + 0.55x = 11.94$</p> <p>Variable: <u>0.55x</u> -6.99 -6.99</p> <p>Total: <u>11.94</u> $\frac{0.55x = 4.95}{0.55 \quad 0.55}$</p> <p style="text-align: center; border: 1px solid purple; padding: 5px; width: fit-content; margin: 0 auto;">$x = 9$ pounds</p>	<p>4. Caitlin has a \$10 gift certificate to the music store. She has chosen a number of CDs from the \$7 bargain bin. If the cost of the CDs is \$32 after the gift certificate is credited, how many CDs did Caitlin buy?</p> <p>Constant: <u>10</u> $7x - 10 = 32$</p> <p>Variable: <u>7x</u> $+10 + 10$</p> <p>Total: <u>32</u> $\frac{7x = 42}{7 \quad 7}$</p> <p style="text-align: center; border: 1px solid red; padding: 5px; width: fit-content; margin: 0 auto;">$x = 6$ cds</p>
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On Own:

<p>5. Mrs. Jackson earned a \$500 bonus for signing a one-year contract to work as a nurse. Her salary is \$22 per hour. If her first week's check including the bonus is \$1,204, how many hours did Mrs. Jackson work?</p> <p>Constant: <u>500</u> $500 + 2x = 1204$</p> <p>Variable: <u>22x</u> -500 -500</p> <p>Total: <u>1204</u> $\frac{22x = 704}{22 \quad 22}$</p> <p style="text-align: center; border: 1px solid blue; padding: 5px; width: fit-content; margin: 0 auto;">$x = 32$ hours</p>	<p>6. Alma subscribes to a website for processing her digital pictures. The subscription is \$5.95 per month and 4-by-6-inch prints are \$0.19 each. How many prints does Alma purchase if the charge for January is \$15.83?</p> <p>Constant: <u>5.95</u> $0.19x + 5.95 = 15.83$</p> <p>Variable: <u>0.19x</u> $-5.95 - 5.95$</p> <p>Total: <u>15.83</u> $\frac{0.19x = 9.88}{0.19 \quad 0.19}$</p> <p style="text-align: center; border: 1px solid blue; padding: 5px; width: fit-content; margin: 0 auto;">$x = 52$ prints</p>
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