

## Solving Equations

Name: Answer Key

To solve equations, it is easier if you simplify both sides of the equation before you begin to solve. Once both sides are simplified, then solve by isolating the variable. To isolate the variable, first look to see if you can add or subtract (a constant) to each side. Then you will multiply or divide each side by the denominator or coefficient. Remember you are using the inverse operation to solve. Once you have solved, check your solution.

$$6x - 2(2x + 4) = 24$$

$$6x - 4x - 8 = 24$$

distributive prop.

$$2x - 8 = 24$$

adding like terms

simplifying

$$2x - 8 + 8 = 24 + 8$$

equality prop. of addition (add 8 to each side)

$$2x = 32$$

addition- additive inverse

$$\frac{2x}{2} = \frac{32}{2}$$

equality prop. of division (divide both sides by 2)

$$x = 16$$

division - multiplicative inverse

Solve. Show your work (like example above...do not have to write down properties).

$$1.) \frac{-3x}{-3} = \frac{12}{-3}$$

$$x = -4$$

$$-3(-4) = 12 \\ 12 = 12 \checkmark$$

$$2.) \frac{-x}{2} = -25 \cdot -2$$

$$x = 50$$

$$3.) \frac{-2x}{-2} = \frac{0}{-2}$$

$$x = 0$$

$$4.) \frac{2x}{2} = \frac{-14}{2}$$

$$x = -7$$

$$5.) \frac{-x}{3} = 9 \cdot -3$$

$$x = -27$$

$$\frac{-27}{-3} = 9$$

$$6.) \frac{7x}{7} = \frac{-21}{7}$$

$$x = -3$$

$$7.) \quad \frac{5x}{5} = \frac{475}{5}$$

$$\boxed{x = 95}$$

$$8.) \quad \frac{x}{3} - 9 = -33$$
$$\quad \quad \quad +9 \quad +9$$

$$3 \cdot \frac{x}{3} = -24 \cdot 3$$

$$\boxed{x = -72}$$

$$9.) \quad 7x + 9 = 23$$
$$\quad \quad \quad -9 \quad -9$$

$$\frac{7x}{7} = \frac{14}{7} \quad \boxed{x = 2}$$

$$10.) \quad \cancel{9} + 6x = -39$$
$$\quad \quad \quad -9 \quad -9$$

$$\frac{6x}{6} = \frac{-48}{6}$$

$$\boxed{x = -8}$$

$$11.) \quad -7x + 3 = 10$$
$$\quad \quad \quad -3 \quad -3$$

$$\frac{-7x}{-7} = \frac{7}{-7} \quad \boxed{x = -1}$$

$$12.) \quad 6x + 8 = 8$$
$$\quad \quad \quad -8 \quad -8$$

$$\frac{6x}{6} = \frac{0}{6} \quad \boxed{x = 0}$$

$$13.) \quad -6x + 9 = 81$$
$$\quad \quad \quad -9 \quad -9$$

$$\frac{-6x}{-6} = \frac{72}{-6} \quad \boxed{x = -12}$$

$$14.) \quad \cancel{5} + 4x = 29$$
$$\quad \quad \quad -5 \quad -5$$

$$\frac{4x}{4} = \frac{24}{4} \quad \boxed{x = 6}$$

$$15.) \quad \frac{x}{2} + 3 = 9$$
$$\quad \quad \quad -3 \quad -3$$

$$2 \cdot \frac{x}{2} = 6 \cdot 2$$

$$\boxed{x = 12}$$

$$16.) \quad 7x + 2 = 30$$
$$\quad \quad \quad -2 \quad -2$$

$$\frac{7x}{7} = \frac{28}{7} \quad \boxed{x = 4}$$

$$17.) \quad 7x - 4 = 73$$
$$\quad \quad \quad +4 \quad +4$$

$$\frac{7x}{7} = \frac{77}{7} \quad \boxed{x = 11}$$

$$18.) \quad 3 - 7x = 38$$
$$\quad \quad \quad -3 \quad -3$$

$$\frac{-7x}{-7} = \frac{35}{-7} \quad \boxed{x = -5}$$

$$19.) \quad 3x + 7 = 7$$
$$\quad \quad \quad -7 \quad -7$$

$$\frac{3x}{3} = \frac{0}{3} \quad \boxed{x = 0}$$

$$20.) \quad -1 - \frac{x}{3} = 26$$
$$\quad \quad \quad +1 \quad +1$$

$$-3 \cdot \frac{x}{3} = 27 \cdot -3$$

$$\boxed{x = -81}$$

$$21.) \quad -4 + 2x + 7x = 86$$
$$\quad \quad \quad -4 + 9x = 86$$
$$\quad \quad \quad +4 \quad \quad \quad +4$$

$$\frac{9x}{9} = \frac{90}{9} \quad \boxed{x = 10}$$

$$22.) \quad 6 - 5x + 3x = -6$$
$$\quad \quad \quad 6 - 2x = -6$$
$$\quad \quad \quad -6 \quad \quad \quad -6$$

$$\frac{-2x}{-2} = \frac{-12}{-2} \quad \boxed{x = 6}$$

23.)  $2 + x + 4x = -48$

$$\begin{array}{r} 2 + 5x = -48 \\ -2 \quad -2 \\ \hline 5x = -50 \\ \frac{5x}{5} = \frac{-50}{5} \end{array}$$

$x = 10$

24.)  $2x - 10 - 7x = -20$

$$\begin{array}{r} -5x - 10 = -20 \\ +10 \quad +10 \\ \hline -5x = -10 \\ \frac{-5x}{-5} = \frac{-10}{-5} \end{array}$$

$x = 2$

25.)  $1 + 6x + x = 15$

$$\begin{array}{r} 1 + 7x = 15 \\ -1 \quad -1 \\ \hline 7x = 14 \\ \frac{7x}{7} = \frac{14}{7} \end{array}$$

$x = 2$

26.)  $2x - 10 - 3x = -22$

$$\begin{array}{r} -x - 10 = -22 \\ +10 \quad +10 \\ \hline -x = -12 \\ \frac{-x}{-1} = \frac{-12}{-1} \end{array}$$

$x = 12$

27.)  $2 + 3x + 7x = 82$

$$\begin{array}{r} 2 + 10x = 82 \\ -2 \quad -2 \\ \hline 10x = 80 \\ \frac{10x}{10} = \frac{80}{10} \end{array}$$

$x = 8$

28.)  $5x + 2 + 4x = 110$

$$\begin{array}{r} 9x + 2 = 110 \\ -2 \quad -2 \\ \hline 9x = 108 \\ \frac{9x}{9} = \frac{108}{9} \end{array}$$

$x = 12$

29.)  $0 = 3x + 2x + 10$

$$\begin{array}{r} 0 = 5x + 10 \\ -10 \quad -10 \\ \hline -10 = 5x \\ \frac{-10}{5} = \frac{5x}{5} \end{array}$$

$x = -2$

30.)  $-6x - 6 - 3x = -42$

$$\begin{array}{r} -9x - 6 = -42 \\ +6 \quad +6 \\ \hline -9x = -36 \\ \frac{-9x}{-9} = \frac{-36}{-9} \end{array}$$

$x = 4$

31.)  $6x - 1 - 3x = -13$

$$\begin{array}{r} 3x - 1 = -13 \\ +1 \quad +1 \\ \hline 3x = -12 \\ \frac{3x}{3} = \frac{-12}{3} \end{array}$$

$x = -4$

32.)  $-6x + 6 + 2x = -30$

$$\begin{array}{r} -4x + 6 = -30 \\ -6 \quad -6 \\ \hline -4x = -36 \\ \frac{-4x}{-4} = \frac{-36}{-4} \end{array}$$

$x = 9$

33.)  $6(1x + 2) = 30$

$$\begin{array}{r} 6x + 12 = 30 \\ -12 \quad -12 \\ \hline 6x = 18 \\ \frac{6x}{6} = \frac{18}{6} \end{array}$$

$x = 3$

34.)  $-7(-3x + 9) = -273$

$$\begin{array}{r} 21x - 63 = -273 \\ +63 \quad +63 \\ \hline 21x = -210 \\ \frac{21x}{21} = \frac{-210}{21} \end{array}$$

$x = -10$

35.)  $-6(-7x + 9) = 72$

$$\begin{array}{r} 42x - 54 = 72 \\ +54 \quad +54 \\ \hline 42x = 126 \\ \frac{42x}{42} = \frac{126}{42} \end{array}$$

$x = 3$

36.)  $4(-6 + 2x) = -48$

$$\begin{array}{r} -24 + 8x = -48 \\ +24 \quad +24 \\ \hline 8x = -24 \\ \frac{8x}{8} = \frac{-24}{8} \end{array}$$

$x = -3$

37.)  $6(-10 + x) = -42$

$$\begin{array}{r} -60 + 6x = -42 \\ +60 \quad +60 \\ \hline 6x = 18 \\ \frac{6x}{6} = \frac{18}{6} \end{array}$$

$x = 3$

38.)  $4(2x - 7) = -84$

$$\begin{array}{r} 8x - 28 = -84 \\ +28 \quad +28 \\ \hline 8x = -56 \\ \frac{8x}{8} = \frac{-56}{8} \end{array}$$

$x = -7$

$$\begin{array}{r}
 39.) \quad -5(-8 + 3x) = -110 \\
 40 - 15x = -110 \\
 -40 \qquad -40 \\
 \hline
 -15x = -150 \\
 -15 \qquad -15 \\
 \hline
 \end{array}$$

$$x = 10$$

$$\begin{array}{r}
 40.) \quad -6(9 + x) = -78 \\
 -54 - 6x = -78 \\
 +54 \qquad +54 \\
 \hline
 -6x = -24 \\
 -6 \qquad -6 \\
 \hline
 \end{array}$$

$$x = 4$$

$$\begin{array}{r}
 41.) \quad 7(2x + 7) = 147 \\
 14x + 49 = 147 \\
 -49 \qquad -49 \\
 \hline
 14x = 98 \\
 14 \qquad 14 \\
 \hline
 \end{array}$$

$$x = 7$$

$$\begin{array}{r}
 42.) \quad -6(-2x + 6) = 96 \\
 12x - 36 = 96 \\
 +36 \qquad +36 \\
 \hline
 12x = 132 \\
 12 \qquad 12 \\
 \hline
 \end{array}$$

$$x = 11$$

$$\begin{array}{r}
 43.) \quad -4(8 + 7x) = -32 \\
 -32 - 28x = -32 \\
 +32 \qquad +32 \\
 \hline
 -28x = 0 \\
 -28 \qquad -28 \\
 \hline
 \end{array}$$

$$x = 0$$

$$\begin{array}{r}
 44.) \quad 5(1x + 10) = 65 \\
 5x + 50 = 65 \\
 -50 \qquad -50 \\
 \hline
 5x = 15 \\
 5 \qquad 5 \\
 \hline
 \end{array}$$

$$x = 3$$

$$\begin{array}{r}
 45.) \quad -7(10 + x) = -7 \\
 -70 - 7x = -7 \\
 +70 \qquad +70 \\
 \hline
 -7x = 63 \\
 -7 \qquad -7 \\
 \hline
 \end{array}$$

$$x = -9$$

$$\begin{array}{r}
 46.) \quad x - 3x + 3 = 11 \\
 2x + 3 = 11 \\
 -3 \qquad -3 \\
 \hline
 2x = 8 \\
 2 \qquad 2 \\
 \hline
 \end{array}$$

$$x = 4$$

$$\begin{array}{r}
 47.) \quad 2(x - 9) + 5 = 1 \\
 2x - 18 + 5 = 1 \\
 2x - 13 = 1 \\
 +13 \qquad +13 \\
 \hline
 2x = 14 \\
 2 \qquad 2 \\
 \hline
 \end{array}$$

$$x = 7$$

$$\begin{array}{r}
 48.) \quad -3(x - 4) + 8 = -6 \\
 -3x + 12 + 8 = -6 \\
 -3x + 20 = -6 \\
 -20 \qquad -20 \\
 \hline
 -3x = -26 \\
 -3 \qquad -3 \\
 \hline
 \end{array}$$

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

$$\begin{array}{r}
 49.) \quad 12 = 4(x - 2) - 2x \\
 12 = 4x - 8 - 2x \\
 12 = 2x - 8 \\
 +8 \qquad +8 \\
 \hline
 20 = 2x \\
 2 \qquad 2 \\
 \hline
 \end{array}$$

$$10 = x$$

$$\begin{array}{r}
 50.) \quad \frac{1}{6}(x + 42) - 15 = -3 \\
 \frac{1}{6}x + 7 - 15 = -3 \\
 \frac{1}{6}x - 8 = -3 \\
 +8 \qquad +8 \\
 \hline
 \frac{1}{6}x = 5 \\
 6 \cdot \frac{1}{6}x = 5 \cdot 6 \\
 \hline
 \end{array}$$

$$x = 30$$