

Chapter 3 - algebraic linear equations in one variable

Solve each equation below. Be sure to show your work.

$$\begin{array}{r}
 1) \quad 3(x-1) - 8 = 4(1+x) + 5 \\
 3x - 3 - 8 = 4 + 4x + 5 \\
 3x - 11 = 4x + 9 \\
 \underline{-3x} \qquad \underline{-3x} \\
 -11 = x + 9 \\
 \underline{-9} \qquad \underline{-9} \\
 -20 = x
 \end{array}$$

$$\begin{array}{r}
 3) \quad 4x + 5 = 2x - 7 \\
 \underline{-2x} \qquad \underline{-2x} \\
 2x + 5 = -7 \\
 \underline{-5} \qquad \underline{-5} \\
 2x = -12 \\
 \underline{2} \qquad \underline{2} \\
 x = -6
 \end{array}$$

$$\begin{array}{r}
 2) \quad \frac{1}{4}(x+2) - 2 = 0.5 \\
 \frac{1}{4}x + \frac{1}{2} - 2 = 0.5 \\
 \frac{1}{4}x - 1\frac{1}{2} = 0.5 \\
 \underline{+1\frac{1}{2}} \qquad \underline{+1\frac{1}{2}} \\
 \frac{1}{4}x = 2 \div \frac{1}{4}
 \end{array}$$

$$\begin{array}{r}
 4) \quad \frac{1}{2}(6x+2) = 2(x-4) \\
 3x + 1 = 2x - 8 \\
 \underline{-2x} \qquad \underline{-2x} \\
 x + 1 = -8 \\
 \underline{-1} \qquad \underline{-1} \\
 x = -9
 \end{array}$$

Identify whether each equation has one solution, no solution or an infinite number of solutions. Show your work

$$\begin{array}{r}
 5) \quad 2x - \frac{1}{4} = \frac{1}{8}(16x + 2) \\
 2x - \frac{1}{4} = 2x + \frac{1}{4} \\
 \underline{-2x} \qquad \underline{-2x} \\
 -\frac{1}{4} = \frac{1}{4} \quad \text{NO SOLUTION}
 \end{array}$$

$$\begin{array}{r}
 6) \quad \frac{1}{3}(x-5) = \frac{1}{3}(x-1) \\
 \frac{1}{3}x - 1 = \frac{1}{3}x - \frac{1}{3} \\
 \underline{-\frac{1}{3}x} \qquad \underline{-\frac{1}{3}x} \\
 -1 = -\frac{1}{3} \quad \text{NO SOLUTION}
 \end{array}$$

7) James earns three times as much as Billy in a week. Gabby earns \$40 more than Billy in the same week. The total weekly salaries for these three people is \$480.

a) If x represents Billy's weekly salary, write a linear equation to find the total weekly salary of the three people, in terms of Billy's salary, x .

$$(x) + (3x) + (x + 40) = 480$$

$$\begin{array}{r}
 5x + 40 = 480 \\
 \underline{-40} \qquad \underline{-40} \\
 5x = 440
 \end{array}$$

$$\begin{array}{r}
 5x = 440 \\
 \underline{5} \qquad \underline{5} \\
 x = 88
 \end{array}$$

$$x = 88$$

$$\text{Gabby} = x + 40$$

$$\text{Gabby} = 88 + 40$$

$$\text{Gabby} = \$128$$

b) What is Gabby's weekly salary?