

MTH 60 Group Work – Tuesday, May 1, 2007

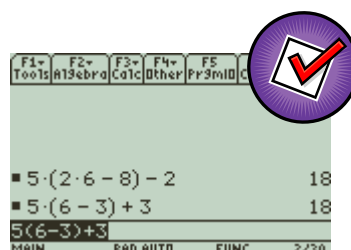
**The problems**

1. Find the solution to the equation  $5(2x - 8) - 2 = 5(x - 3) + 3$ .
2. Find the solution set to  $5t - 3(t + 1) = 2(t + 3) - 5$ .
3. Find the solution set to the equation  $\frac{x}{2} - \frac{x}{4} + 4 = x + 4$ .
4. Find the solution to the equation  $2(y + 4) = 4y + 5 - 2y + 3$ .
5. Find the solution to  $100 = 4(w - 6) - (w - 1)$ .
6. Find the solution set to  $7 + 2(3z - 5) = 8 - 3(2z + 1)$ .
7. Find the solution to the equation  $\frac{y}{12} + \frac{1}{6} = \frac{y}{2} - \frac{1}{4}$ .
8. Find the solution set to the equation  $\frac{x - 3}{5} - 1 = \frac{x - 5}{4}$ .

**The solutions**

1. Find the solution to the equation  $5(2x - 8) - 2 = 5(x - 3) + 3$ .

$$\begin{aligned}
 5(2x - 8) - 2 &= 5(x - 3) + 3 \\
 10x - 40 - 2 &= 5x - 15 + 3 \\
 10x - 42 &= 5x - 12 \\
 10x - 42 - 5x &= 5x - 12 - 5x \\
 5x - 42 &= -12 \\
 5x - 42 + 42 &= -12 + 42 \\
 5x &= 30 \\
 \frac{5x}{5} &= \frac{30}{5} \\
 x &= 6
 \end{aligned}$$



The solution to the equation  $5(2x - 8) - 2 = 5(x - 3) + 3$  is 6.

2. Find the solution set to  $5t - 3(t + 1) = 2(t + 3) - 5$ .

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

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

$$2t - 3 = 2t - 1$$

$$2t - 3 - 2t = 2t - 1 - 2t$$

$$-3 = -1$$

The solution set to  $5t - 3(t + 1) = 2(t + 3) - 5$  is  $\{ \}$ .

The only way to check a contradiction is to double check your work; or, better yet, rework the problem.

3. Find the solution set to the equation  $\frac{x}{2} - \frac{x}{4} + 4 = x + 4$ .

$$\frac{x}{2} - \frac{x}{4} + 4 = x + 4$$

$$4 \cdot \left( \frac{x}{2} - \frac{x}{4} + 4 \right) = 4 \cdot (x + 4)$$

$$\frac{4}{1} \cdot \frac{x}{2} - \frac{4}{1} \cdot \frac{x}{4} + 4 \cdot 4 = 4x + 16$$

$$2x - x + 16 = 4x + 16$$

$$x + 16 = 4x + 16$$

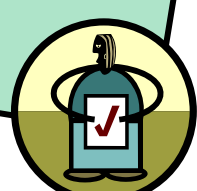
$$x + 16 - x = 4x + 16 - x$$

$$16 = 3x + 16$$

$$0 = 3x$$

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

$$0 = x$$

$$\frac{0}{2} - \frac{0}{4} + 4 = 0 + 4$$


The solution set to the equation

$$\frac{x}{2} - \frac{x}{4} + 4 = x + 4 \text{ is } \{0\}.$$

4. Find the solution to the equation  $2(y + 4) = 4y + 5 - 2y + 3$ .

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

$$2y + 8 = 2y + 8$$

$$2y + 8 - 2y = 2y + 8 - 2y$$

$$8 = 8$$

F1	F2	F3	F4	F5	F6
Tools	Algebra	Calc	Other	Pr3mID	Clean Up
2 * (0 + 4)					
					8
4 * 0 + 5 - 2 * 0 + 3					
					8
2 * (1 + 4)					
					10
4 * 1 + 5 - 2 * 1 + 3					
					10
4 * 1 + 5 - 2 * 1 + 3					
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Check 0

Check 1

Every real number is a solution to the equation  $2(y + 4) = 4y + 5 - 2y + 3$ !

5. Find the solution to  $100 = 4(w - 6) - (w - 1)$ .

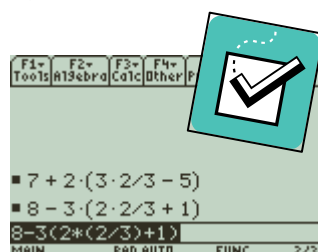
$$\begin{aligned} 100 &= 4(w - 6) - (w - 1) \\ 100 &= 4w - 24 - w + 1 \\ 100 &= 3w - 23 \\ 100 + 23 &= 3w - 23 + 23 \\ 123 &= 3w \\ \frac{1}{3} \cdot (123) &= \frac{1}{3} \cdot (3w) \\ 41 &= w \end{aligned}$$

$$\begin{aligned} 100 &= 4(41 - 6) - (41 - 1) ? \\ 100 &= 4(35) - 40 ? \\ 100 &= 140 - 40 \end{aligned}$$


The solution to  $100 = 4(w - 6) - (w - 1)$  is 41.

6. Find the solution set to  $7 + 2(3z - 5) = 8 - 3(2z + 1)$ .

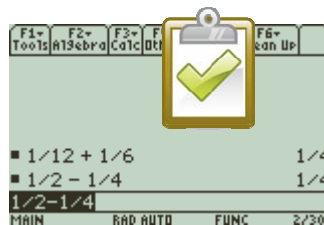
$$\begin{aligned} 7 + 2(3z - 5) &= 8 - 3(2z + 1) \\ 7 + 6z - 10 &= 8 - 6z - 3 \\ 6z - 3 &= 5 - 6z \\ 6z - 3 + 6z &= 5 - 6z + 6z \\ 12z - 3 &= 5 \\ 12z - 3 + 3 &= 5 + 3 \\ 12z &= 8 \\ \frac{1}{12} \cdot (12z) &= \frac{1}{12} \cdot (8) \\ z &= \frac{8}{12} = \frac{2}{3} \end{aligned}$$



The solution set to  $7 + 2(3z - 5) = 8 - 3(2z + 1)$  is  $\left\{ \frac{2}{3} \right\}$ .

7. Find the solution to the equation  $\frac{y}{12} + \frac{1}{6} = \frac{y}{2} - \frac{1}{4}$ .

$$\begin{aligned}\frac{y}{12} + \frac{1}{6} &= \frac{y}{2} - \frac{1}{4} \\ 12 \cdot \left( \frac{y}{12} + \frac{1}{6} \right) &= 12 \cdot \left( \frac{y}{2} - \frac{1}{4} \right) \\ \frac{12}{1} \cdot \frac{y}{12} + \frac{12}{1} \cdot \frac{1}{6} &= \frac{12}{1} \cdot \frac{y}{2} - \frac{12}{1} \cdot \frac{1}{4} \\ y + 2 &= 6y - 3 \\ y + 2 - y &= 6y - 3 - y \\ 2 &= 5y - 3 \\ 2 + 3 &= 5y - 3 + 3 \\ 5 &= 5y \\ \frac{1}{5} \cdot (5) &= \frac{1}{5} \cdot (5y) \\ 1 &= y\end{aligned}$$



The solution to the equation

$$\frac{y}{12} + \frac{1}{6} = \frac{y}{2} - \frac{1}{4} \text{ is } 1.$$

8. Find the solution set to the equation  $\frac{x-3}{5} - 1 = \frac{x-5}{4}$ .

$$\begin{aligned}\frac{x-3}{5} - 1 &= \frac{x-5}{4} \\ 20 \cdot \left( \frac{x-3}{5} - 1 \right) &= 20 \cdot \left( \frac{x-5}{4} \right) \\ \frac{20}{1} \cdot \left( \frac{x-3}{5} \right) - 20 \cdot 1 &= \frac{20}{1} \cdot \left( \frac{x-5}{4} \right) \\ 4(x-3) - 20 &= 5(x-5) \\ 4x - 12 - 20 &= 5x - 25 \\ 4x - 32 &= 5x - 25 \\ 4x - 32 - 4x &= 5x - 25 - 4x \\ -32 &= x - 25 \\ -32 + 25 &= x - 25 + 25 \\ -7 &= x\end{aligned}$$

The solution set to the equation

$$\frac{x-3}{5} - 1 = \frac{x-5}{4} \text{ is } \{-7\}.$$

$$\begin{aligned}\frac{20}{1} \cdot \left( \frac{x-3}{5} \right) &= 4(x-3) \\ \frac{5}{1} \cdot \left( \frac{x-5}{4} \right) &= 5(x-5)\end{aligned}$$

