

Solving Equations

Rules for Rearranging Equations/ Formulas

1. If you want to move a **term** from one side of the "=" to the other: do the **opposite operation**.
2. What you do to one side of the "=" you **MUST** do to the other side.
3. Get rid of things farthest away from the variable **FIRST!** (reverse BEDMAS)

Table of opposite operations...

+	-	÷	×	√	x^2
-	+	×	÷	x^2	√

$$\begin{aligned}x^2 &= 25 \\ \sqrt{x^2} &= \sqrt{25} \\ x &= 5\end{aligned}$$

Solve.

$$\begin{aligned}1. \quad x + 2 &= 5 \\ -2 \quad -2 & \\ x &= 3\end{aligned}$$

$$\begin{aligned}2. \quad x - 7 &= 9 \\ +7 \quad +7 & \\ x &= 16\end{aligned}$$

$$\begin{aligned}3. \quad \frac{3x}{3} &= \frac{15}{3} \\ x &= 5\end{aligned}$$

$$\begin{aligned}4. \quad \frac{x}{4} &= 8 \\ x &= 32\end{aligned}$$

Solving Equations

Solving 2 Step Equations

* Remember to get rid of things farthest away from the variable FIRST!
(reverse BEDMAS)

1. $5x - 4 = 11$

$$+4 \quad +4$$

$$\frac{5x}{5} = \frac{15}{5}$$

$$x = 3$$

2. $3m + 6 = 18$

$$-6 \quad -6$$

$$\frac{3m}{3} = \frac{12}{3}$$

$$m = 4$$

3. $\frac{k}{2} + 14 = 16$

$$-14 \quad -14$$

$$2 \times \frac{k}{2} = 2 \times 2$$

$$k = 4$$

4. $-p + 6 = 16$

$$-6 \quad -6$$

$$\frac{-p}{-1} = \frac{10}{-1}$$

$$p = -10$$

5. $\frac{h}{3} - 6 = 5$

$$+6 \quad +6$$

$$\frac{h}{3} = 11$$

$$h = 33$$

6. $-3u + 14 = -4$

$$-14 \quad -14$$

$$-3u = -18$$

$$\div (-3) \quad \div (-3)$$

$$u = 6$$

How do you "Check" whether your answer is correct?

Sub your answer back into the equation

$$LS = -3u + 14$$

$$RS = -4$$

$$= -3(6) + 14$$

$$= -18 + 14$$

$$= -4$$



* needs to be balanced!

Solving Equations

Practice Work:

One Step Equation practice. Show your work

1. $x + 7 = 18$

2. $x - 5 = -3$

3. $6x = 24$

4. $\frac{x}{2} = 9$

5. $x + 3 = -5$

6. $x - 5 = 13$

7. $-5x = 30$

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

9. $6 + x = 14$

10. $-2 = -8 + x$

Two Step Equation practice. Show your work.

11. $2x - 5 = 9$

12. $3y + 4 = 16$

13. $7t - 10 = -4$

14. $5m + 28 = 13$

15. $\frac{x}{2} - 3 = 17$

16. $\frac{y}{3} + 6 = 8$

17. $5 + 2x = 13$

18. $3 + \frac{x}{4} = 7$

19. $-4x + 7 = 1$

20. $-12 + \frac{x}{5} = -18$

Solutions: 1) 11 2) 2 3) 4 4) 18 5) -8 6) 18 7) -6 8) 12 9) 8 10) 6
11) 7 12) 4 13) -5 14) -3 15) 40 16) 6 17) 4 18) 16 19) -1 20) -30

Answer Breakdowns Below

Solving Equations

Solutions...

MFM 2P - Connell

0.5 Solving Equations Work Sheet

Date: _____

One Step Equations Practice. Show your work.

$$\begin{aligned} 1. \quad x + 7 &= 18 \\ -7 \quad -7 \\ \hline x &= 11 \end{aligned}$$

$$\begin{aligned} 2. \quad x - 5 &= -3 \\ +5 \quad +5 \\ \hline x &= 2 \end{aligned}$$

$$\begin{aligned} 3. \quad \frac{6x}{6} &= \frac{24}{6} \\ \hline x &= 4 \end{aligned}$$

$$\begin{aligned} 4. \quad x \times \frac{x}{2} &= 9 \times 2 \\ \hline x &= 18 \end{aligned}$$

$$\begin{aligned} 5. \quad x + 3 &= -5 \\ -3 \quad -3 \\ \hline x &= -8 \end{aligned}$$

$$\begin{aligned} 6. \quad x - 5 &= 13 \\ +5 \quad +5 \\ \hline x &= 18 \end{aligned}$$

$$\begin{aligned} 7. \quad \frac{-5x}{-5} &= \frac{30}{-5} \\ \hline x &= -6 \end{aligned}$$

$$\begin{aligned} 8. \quad \frac{x}{3} &= -4 \times (-3) \\ \hline x &= 12 \end{aligned}$$

$$\begin{aligned} 9. \quad 6 + x &= 14 \\ -6 \quad -6 \\ \hline x &= 8 \end{aligned}$$

$$\begin{aligned} 10. \quad -2 &= -8 + x \\ +8 \quad +8 \\ \hline 6 &= x \end{aligned}$$

Solutions: 1) 11 2) 2 3) 4 4) 18 5) -8 6) 18 7) -6 8) 12 9) 8 10) 6

Solving Equations

Solutions...

Two Step Equations Practice. Show your work.

1. $2x - 5 = 9$

$$\begin{array}{r} +5 \quad +5 \\ 2x = 14 \end{array}$$

$$\begin{array}{r} 2x = 14 \\ \cancel{2} \quad \cancel{2} \\ x = 7 \end{array}$$

2. $3y + 4 = 16$

$$\begin{array}{r} -4 \quad -4 \\ 3y = 12 \\ \cancel{3} \quad \cancel{3} \\ y = 4 \end{array}$$

3. $7t - 10 = -45$

$$\begin{array}{r} +10 \quad +10 \\ 7t = -35 \end{array}$$

$$\begin{array}{r} 7t = -35 \\ \cancel{7} \quad \cancel{7} \\ t = -5 \end{array}$$

4. $5m + 28 = 13$

$$\begin{array}{r} -28 \quad -28 \\ 5m = -15 \end{array}$$

$$\begin{array}{r} 5m = -15 \\ \cancel{5} \quad \cancel{5} \\ m = -3 \end{array}$$

5. $\frac{x}{2} - 3 = 17$

$$\begin{array}{r} +3 \quad +3 \\ \frac{x}{2} = 20 \end{array}$$

$$\frac{x}{2} = 20$$

$$2 \times \frac{x}{2} = 20 \times 2$$

$$x = 40$$

6. $\frac{y}{3} + 6 = 8$

$$\begin{array}{r} -6 \quad -6 \\ \frac{y}{3} = 2 \end{array}$$

$$\frac{y}{3} = 2$$

$$3 \times \frac{y}{3} = 2 \times 3$$

$$y = 6$$

7. $5 + 2x = 13$

$$\begin{array}{r} -5 \quad -5 \\ 2x = 8 \end{array}$$

$$2x = 8$$

$$\begin{array}{r} 2x = 8 \\ \cancel{2} \quad \cancel{2} \\ x = 4 \end{array}$$

$$x = 4$$

8. $3 + \frac{x}{4} = 7$

$$\begin{array}{r} -3 \quad -3 \\ \frac{x}{4} = 4 \end{array}$$

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

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

$$x = 16$$

9. $-4x + 7 = 11$

$$\begin{array}{r} -7 \quad -7 \\ -4x = 4 \end{array}$$

$$-4x = 4$$

$$\begin{array}{r} -4x = 4 \\ \cancel{-4} \quad \cancel{-4} \\ x = -1 \end{array}$$

$$x = -1$$

10. $-12 + \frac{x}{5} = -18$

$$\begin{array}{r} +12 \quad +12 \\ \frac{x}{5} = -6 \end{array}$$

$$\frac{x}{5} = -6$$

$$5 \times \frac{x}{5} = -6 \times 5$$

$$x = -30$$

Solutions: 1) 7 2) 4 3) -5 4) -3 5) 40 6) 6 7) 4 8) 16 9) -1 10) -30

Solving Equations

Solving Multi-step Equations

- * Get all variable terms on the same side
- * Combine like terms on the same side of the equal sign

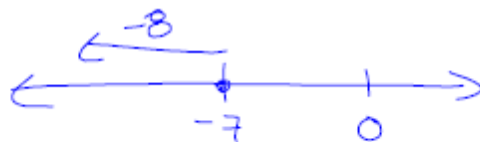
$$\underline{7x + 8} - \underline{2x} = -7$$

$$5x + \cancel{8} = -7$$

$$-8 \quad -8$$

$$\frac{5x}{5} = \frac{-15}{5}$$

$$x = -3$$



$$5x + 2 = 3x - 8$$

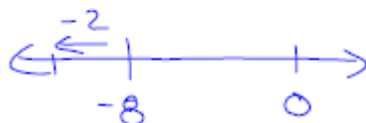
$$-3x \quad -3x$$

$$2x + \cancel{2} = -8$$

$$-2 \quad -2$$

$$\frac{2x}{2} = \frac{-10}{2}$$

$$x = -5$$



Complete the rest of the handout on your own.

Check your answers at the bottom of the second page.

Solving Equations

Solve the following. Show all of your work.

1. $-24 = 7x + 18$

2. $-4m + 5 = 15$

3. $-\frac{k}{3} - 11 = -20$

4. $10 - 6v = -104$

5. $20 = 4x + 6x$

6. $6 = 1 - 2n + 9$

7. $8x - 2 = -9 + 7x$

8. $a - 5 = -5a + 5$

9. $4m - 4 = 5m$

10. $p - 1 = 5p + 3p - 8$

Solving Equations

Solutions...

Solve the following. Show all of your work.

$$\begin{aligned} 1. \quad & -24 - 7x + 18 \\ & -18 \quad -18 \\ & -42 = 7x \\ & \frac{-42}{7} = \frac{7x}{7} \\ & -6 = x \end{aligned}$$

$$\begin{aligned} 2. \quad & -4m + 5 = -15 \\ & -8 \quad -5 \\ & -4m = -20 \\ & \frac{-4m}{-4} = \frac{-20}{-4} \\ & m = 5 \end{aligned}$$

$$\begin{aligned} 3. \quad & \frac{k}{3} - 11 = -20 \\ & +11 \quad +11 \\ & \frac{k}{3} = -9 \\ (\times 3) \quad & \left(\frac{k}{3}\right) = (-3)(-9) \\ & k = 27 \end{aligned}$$

$$\begin{aligned} 4. \quad & 10 - 6v = -104 \\ & -10 \quad -10 \\ & -6v = -114 \\ & \frac{-6v}{-6} = \frac{-114}{-6} \\ & v = 19 \end{aligned}$$

$$\begin{aligned} 5. \quad & 20 = 4x + 6x \\ & 20 = 10x \\ & \frac{20}{10} = \frac{10x}{10} \\ & 2 = x \end{aligned}$$

$$\begin{aligned} 6. \quad & 6 = 1 - 2n + 9 \\ & 6 = -2n + 10 \\ & -10 \quad -10 \\ & -4 = -2n \\ & \frac{-4}{-2} = \frac{-2n}{-2} \\ & 2 = n \end{aligned}$$

$$\begin{aligned} 7. \quad & 8x - 2 = -9 + 7x \\ & -7x \quad -7x \\ & x - 2 = -9 \\ & +2 \quad +2 \\ & x = -7 \end{aligned}$$

$$\begin{aligned} 8. \quad & a - 5 = -5a + 5 \\ & +5a \quad +5a \\ & 6a - 5 = 5 \\ & +5 \quad +5 \\ & 6a = 10 \\ & \frac{6a}{6} = \frac{10}{6} \\ & a = \frac{10}{6} \\ & a = \frac{5}{3} \end{aligned}$$

$$\begin{aligned} 9. \quad & 4m - 4 = 5m \\ & -5m \quad -5m \\ & -m - 4 = 0 \\ & +4 \quad +4 \\ & -m = 4 \\ & \frac{-m}{-1} = \frac{4}{-1} \\ & m = -4 \end{aligned}$$

$$\begin{aligned} 10. \quad & p - 1 = 5p + 3p - 8 \\ & p - 1 = 8p - 8 \\ & -8p \quad -8p \\ & -7p - 1 = -8 \\ & +1 \quad +1 \\ & -7p = -7 \\ & \frac{-7p}{-7} = \frac{-7}{-7} \\ & p = 1 \end{aligned}$$

$$\begin{aligned} 11. \quad & 5p - 14 = 8p + 4 \\ & -8p \quad -8p \\ & -3p - 14 = 4 \\ & +14 \quad +14 \\ & -3p = 18 \\ & \frac{-3p}{-3} = \frac{18}{-3} \\ & p = -6 \end{aligned}$$

$$\begin{aligned} 12. \quad & p - 3 = -9 + 3p \\ & -3p \quad -3p \\ & -2p - 3 = -9 \\ & +3 \quad +3 \\ & -2p = -6 \\ & \frac{-2p}{-2} = \frac{-6}{-2} \\ & p = 3 \end{aligned}$$