

Warm up back of p. 44

$$\begin{array}{r|l}
 -5x + 3 = 28 & \\
 -3 & -3 \\
 \hline
 -5x & 25 \\
 -5 & -5 \\
 \hline
 x & -5
 \end{array}$$

$x = -5$

$$\begin{array}{r|l}
 \frac{x}{3} - 8 = -2 & \\
 +8 & +8 \\
 \hline
 \frac{x}{3} & 6 \\
 \hline
 x & 18
 \end{array}$$

$x = 18$

$$\begin{array}{r|l}
 \frac{3}{4}x + 3 = 12 & \\
 +3 & +3 \\
 \hline
 \frac{3}{4}x & 9 \\
 \hline
 x & 12
 \end{array}$$

$x = 12$

$x = 20$

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Main Ideas/Questions	Notes/Examples
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**TWO-STEP EQUATIONS**

$px + q = r$

**Steps to Solve:**

- ① Locate the variable.
- ② Undo the addition/subtraction to remove "q".
- ③ Undo the multiplication/division to remove "p".
- ④ Check your solution!

**EXAMPLES**

**Directions:** Solve each equation. Check all solutions.

1.  $9a - 2 = -65$

$$\begin{array}{r} \cancel{+2} + 2 \\ \hline 9a = -63 \\ \cancel{9} \quad \quad 9 \end{array}$$

$a = -7$

2.  $-4x + 7 = 31$

$-6$

3.  $\frac{k}{3} - 11 = -5$

$$\begin{array}{r} \cancel{+11} + 11 \\ \hline \cancel{3} \cdot \frac{k}{3} = 6 \cdot 3 \\ k = 18 \end{array}$$

4.  $8 = 23 - 5w$

$$\begin{array}{r} 8 = 23 - 5w \\ \cancel{-23} \quad \quad \quad \cancel{-23} \\ \hline -15 = -5w \\ \cancel{-5} \quad \quad \quad \cancel{5} \\ w = 3 \end{array}$$

5.  $8m - 11 = -11$

$$\begin{array}{r} \cancel{+11} + 11 \\ \hline 8m = 0 \\ \cancel{8} \quad \quad \quad \cancel{8} \end{array}$$

$m = 0$

6.  $-6 = 1 + \frac{n}{-4}$

$$\begin{array}{r} -4 \left( \frac{-1}{-4} \right) = \left( \frac{n}{-4} \right) - 4 \\ \hline 28 = n \end{array}$$

7.  $19 - x = 30$

$-11$

8.  $-17 + \frac{r}{2} = -25$

$-16$

<p><math>3 \cdot \frac{2}{3} \cdot \frac{6}{3} = 2</math></p>	<p>9. <math>0.4x + 9 = 11</math></p> <p style="text-align: center; color: red;">5</p>	<p>10. <math>-18 - 10 = -1.5m</math></p> $\begin{array}{r} +10 \quad +10 \\ \hline -8 = -1.5m \\ -1.5 \quad -1.5 \\ \hline 5.3 = m \end{array}$
	<p>11. <math>\frac{v}{-0.8} + 14 = 39</math></p> <p style="text-align: center; color: red;">-20</p>	<p>12. <math>\frac{2}{3}x - 7 = 5</math></p> $\begin{array}{r} +7 \quad +7 \\ \hline \frac{2}{3}x = 12 \\ \frac{2}{3}x = 12 \cdot \frac{3}{2} \\ x = 36 \end{array}$
	<p>13. <math>-1 = -\frac{5}{8}c + 9</math></p> <p style="text-align: center; color: red;">16</p>	<p>14. <math>\frac{1}{3}m - 16 = -1</math></p> <p style="text-align: center; color: red;">45</p> <p style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px;"><math>x = 18</math></p>
<p>TWO-STEP EQUATIONS</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <math display="block">\frac{x + q}{p} = r</math> </div>	<p>Steps to Solve:</p>	
	<ol style="list-style-type: none"> <li>① Locate the variable.</li> <li>② Undo the multiplication/division to remove "p".</li> <li>③ Undo the addition/subtraction to remove "q".</li> <li>④ Check your solution!</li> </ol>	
<p>EXAMPLES</p>	<p>15. <math>\frac{x-1}{6} = 2</math></p> $\begin{array}{r} x-1 = 12 \\ +1 \quad +1 \\ \hline x = 13 \end{array}$	<p>16. <math>9\left(\frac{m+17}{-2}\right) = 2</math></p> $\begin{array}{r} -18 = m+17 \\ -17 \quad -17 \\ \hline -35 = m \end{array}$
	<p>17. <math>-3 = \frac{k-5}{16}</math></p>	<p>18. <math>\frac{p+20}{7} = -4</math></p>

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Main Ideas/Questions	Notes/Examples	
<p><b>MULTI-STEP EQUATIONS</b> (Variables on Both Sides)</p>	<b>Steps to Solve:</b>	
	①	Simplify each side of the equation if needed. (Distribute/Combine)
	②	Use inverse operations to move variables to one side.
	③	Solve the remaining equation.
	④	Check your solution!
<p><b>EXAMPLES</b></p>	<b>Directions:</b> Solve each equation. Check all solutions.	
	<p>1. <math>8x + 17 = 2x + 35</math></p> $\begin{array}{r l} -2x & -2x \\ \hline 6x + 17 & 2x + 35 \\ -17 & -17 \\ \hline 6x & 18 \\ \hline \frac{6x}{6} & = \frac{18}{6} \end{array}$ <p style="text-align: right; margin-right: 50px;"><math>x = 3</math></p>	<p>2. <math>7k + 8 = 2k - 37</math></p> $\begin{array}{r l} -2k & -2k \\ \hline 5k + 8 & = -37 \\ -8 & -8 \\ \hline 5k & = -45 \\ \hline \frac{5k}{5} & = \frac{-45}{5} \end{array}$ <p style="text-align: right; margin-right: 50px;"><math>x = -9</math></p>
	3. $m + 3 = 9m - 13$	4. $-4y + 6 = -3y + 12$
	5. $6a + 40 = 2a$	6. $5w - 29 = 55 - 2w$
	7. $5p - 11 = 13p - 43$	8. $-50 - c = 5c - 2$

	<p>9. <math>-5x - 16 + 3x = -23 - 9x</math></p> $\begin{array}{r l} -2x - 16 & -23 - 9x \\ + 9x & + 9x \\ \hline 7x - 16 & -23 \\ + 16 & + 16 \\ \hline 7x = -7 & \end{array}$ <p><math>x = -1</math></p>	<p>10. <math>6r - 5 = 1 + 8r - 24</math></p>
	<p>11. <math>9a - 7a = 3a - 33 + 2a</math></p>	<p>12. <math>-5 + 7m - 20 = 20 - 2m</math></p>
	<p>13. <math>4(k - 2) = 2(k - 9)</math></p> $\begin{array}{r l} 4k - 8 & 2k - 18 \\ - 2k & - 2k \\ \hline 2k - 8 & - 18 \\ + 8 & + 8 \\ \hline 2k = -10 & \end{array}$ <p><math>\frac{2k}{2} = \frac{-10}{2}</math> <math>k = -5</math></p>	<p>14. <math>-6(n - 3) = 5(4 - n)</math></p>
	<p>15. <math>-8(p + 2) + p = 4(p + 3) + 5</math></p>	<p>16. <math>-\frac{1}{2}(12v - 20) + 4 = -12 - 8v</math></p>

# RIDDLE: What happened to the plant in math class?

**Directions:** Solve each equation. Show all work on a separate sheet of paper. After completing each set, find matching answers. One will have a letter and the other a number. Write the letter in the matching numbered box at the bottom of the page.

SET 1	
<b>S.</b> $5(x - 1) = 35$ _____	<b>10.</b> $2(2x - 9) = 38$ _____
<b>R.</b> $40 = 15 - 9x - 2$ _____	<b>7.</b> $3x - 1 - 7x = -33$ _____
<b>A.</b> $-2(x - 5) - 4 = -22$ _____	<b>16.</b> $-41 = -18 - (3 - 4x)$ _____
<b>O.</b> $-13 = 4(5x - 1) - 11x$ _____	<b>4.</b> $6(x - 1) - x = -21$ _____
<b>T.</b> $4 - 2(3x + 1) = 32$ _____	<b>14.</b> $24 = 28 - 9x + 13x$ _____
SET 2	
<b>G.</b> $7n + 15 = 5n - 9$ _____	<b>9.</b> $9n - 14 = 5n + 58$ _____
<b>S.</b> $-4n - 1 = 2n - 25$ _____	<b>1.</b> $18 - 4n = 2n + 60$ _____
<b>R.</b> $16 - 2n = n - 11$ _____	<b>5.</b> $2n + 23 = -19 - n$ _____
<b>I.</b> $-15 - 5n = 3n + 41$ _____	<b>17.</b> $-3n - 16 = 4n - 44$ _____
<b>U.</b> $n - 26 = 28 - 2n$ _____	<b>3.</b> $-5n - 34 = 14 - n$ _____
<b>E.</b> $11n + 23 = 6n - 47$ _____	<b>13.</b> $-6n + 5 = 2n - 67$ _____
SET 3	
<b>W.</b> $2(3a + 5) = 2a + 54$ _____	<b>15.</b> $18a - 9 = 5(2a + 3)$ _____
<b>E.</b> $4 - 7a = 3 - a + 13$ _____	<b>11.</b> $16 - 5a + 2a - 1 = 41 - a$ _____
<b>Q.</b> $5(2a - 3) = 3(a - 19)$ _____	<b>2.</b> $4(2a - 9) = 5(3a - 7) - 1$ _____
<b>T.</b> $3(4 - a) = 2(a + 6)$ _____	<b>12.</b> $7(3a + 4) = 11(a - 1) + 19$ _____
<b>R.</b> $8 - (2a + 7) = a + 40$ _____	<b>6.</b> $\frac{1}{2}(8a - 20) = 2(a + 6)$ _____
<b>O.</b> $-2(6a - 1) = -\frac{5}{3}(3a + 15) + 6$ _____	<b>8.</b> $6a + 34 = 3 - (2a + 17)$ _____

## ANSWER:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	!
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