

Distributive Property and Combining Like Terms Equations

Name: Key

Solve each equation. Be sure to show ALL STEPS!!

$$\begin{aligned}
 1. \quad & 4(2x + 7) = 108 \\
 & 8x + 28 = 108 \\
 & \quad -28 \quad -28 \\
 \hline
 & 8x = 80 \\
 & \quad \frac{8}{8} \quad \frac{80}{8} \\
 & \boxed{x = 10}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & 8(3x - 1) = -80 \\
 & 24x - 8 = -80 \\
 & \quad +8 \quad +8 \\
 \hline
 & 24x = -72 \\
 & \quad \frac{24}{24} \quad \frac{-72}{24} \\
 & \boxed{x = -3}
 \end{aligned}$$

Same side = combine

$$\begin{aligned}
 5. \quad & 15 - 2(2x + 7) = 14 \\
 & 15 - 2x - 14 = 14 \\
 & \quad -2x + 1 = 14 \\
 & \quad \quad -1 \quad -1 \\
 \hline
 & \quad -2x = 13 \\
 & \quad \quad \frac{-2}{-2} \quad \frac{13}{-2} \\
 & \quad \boxed{x = -3}
 \end{aligned}$$

opposite side = inverse

$$\begin{aligned}
 7. \quad & 10x - 3(8 - 5x) = -74 \\
 & 10x - 24 + 15x = -74 \\
 & 25x - 24 = -74 \\
 & \quad +24 \quad +24 \\
 \hline
 & 25x = -50 \\
 & \quad \frac{25}{25} \quad \frac{-50}{25} \\
 & \quad \boxed{x = -2}
 \end{aligned}$$

$$\begin{aligned}
 9. \quad & 2(x + 7) + x = 20 \\
 & 2x + 14 + x = 20 \\
 & 3x + 14 = 20 \\
 & \quad -14 \quad -14 \\
 \hline
 & 3x = 6 \\
 & \quad \frac{3}{3} \quad \frac{6}{3} \\
 & \quad \boxed{x = 2}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & -4(2x + 11) = 92 \\
 & -8x - 44 = 92 \\
 & \quad +44 \quad +44 \\
 \hline
 & -8x = 136 \\
 & \quad \frac{-8}{-8} \quad \frac{136}{-8} \\
 & \quad \boxed{x = -17}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad & -7(3x - 1) = 91 \\
 & -21x + 7 = 91 \\
 & \quad -7 \quad -7 \\
 \hline
 & -21x = 84 \\
 & \quad \frac{-21}{-21} \quad \frac{84}{-21} \\
 & \quad \boxed{x = -4}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad & 17 - 6(x + 3) = -16 \\
 & 17 - 6x - 18 = -16 \\
 & -6x - 1 = -16 \\
 & \quad +1 \quad +1 \\
 \hline
 & -6x = -17 \\
 & \quad \frac{-6}{-6} \quad \frac{-17}{-6} \\
 & \quad \boxed{x = 5}
 \end{aligned}$$

$$\begin{aligned}
 8. \quad & 4(3x + 2) - 18 = 14 \\
 & 12x + 8 - 18 = 14 \\
 & 12x - 10 = 14 \\
 & \quad +10 \quad +10 \\
 \hline
 & 12x = 24 \\
 & \quad \frac{12}{12} \quad \frac{24}{12} \\
 & \quad \boxed{x = 2}
 \end{aligned}$$

$$\begin{aligned}
 10. \quad & 2(x - 1) + 3x = 3 \\
 & 2x - 2 + 3x = 3 \\
 & 5x - 2 = 3 \\
 & \quad +2 \quad +2 \\
 \hline
 & 5x = 5 \\
 & \quad \frac{5}{5} \quad \frac{5}{5} \\
 & \quad \boxed{x = 1}
 \end{aligned}$$

$$11. \overbrace{3(m+1)} - 2m = 0$$

$$\underline{\underline{3m + 3 - 2m = 0}}$$

$$\underline{\underline{m + 3 = 0}}$$

$$\underline{\underline{-3 \quad -3}}$$

$$\boxed{m = -3}$$

$$13. -\overbrace{\frac{1}{2}(b+2)} + 3b = -1$$

$$\underline{\underline{-\frac{1}{2}b - 1 + 3b = -1}}$$

$$\underline{\underline{2\frac{1}{2}b - 1 = -1}}$$

$$\underline{\underline{+1 \quad +1}}$$

$$\underline{\underline{2\frac{1}{2}b = 0}}$$

$$\underline{\underline{2\frac{1}{2} \quad 2\frac{1}{2}}}$$

$$\boxed{b = 0}$$

$$15. 4 + \overbrace{2(1+x)} = 12$$

$$\underline{\underline{4 + 2 + 2x = 12}}$$

$$\underline{\underline{6 + 2x = 12}}$$

$$\underline{\underline{-6 \quad -6}}$$

$$\underline{\underline{2x = 6}}$$

$$\underline{\underline{2 \quad 2}}$$

$$\boxed{x = 3}$$

$$17. \overbrace{2(2x+3)} - 2 = 5$$

$$\underline{\underline{4x + 6 - 2 = 5}}$$

$$\underline{\underline{4x + 4 = 5}}$$

$$\underline{\underline{-4 \quad -4}}$$

$$\underline{\underline{4x = 1}}$$

$$\underline{\underline{\frac{1}{4} \quad \frac{1}{4}}}$$

$$\boxed{x = \frac{1}{4}}$$

$$12. z + \overbrace{4(2z+3)} = 15$$

$$\underline{\underline{z + 8z + 12 = 15}}$$

$$\underline{\underline{9z + 12 = 15}}$$

$$\underline{\underline{-12 \quad -12}}$$

$$\underline{\underline{\frac{9z}{9} = \frac{3}{9}}}$$

$$\boxed{z = \frac{3}{9} = \frac{1}{3}}$$

* reduce fractions!

$$14. \overbrace{4(n+2)} - 2n = 0$$

$$\underline{\underline{4n + 8 - 2n = 0}}$$

$$\underline{\underline{2n + 8 = 0}}$$

$$\underline{\underline{-8 \quad -8}}$$

$$\underline{\underline{\frac{2n}{2} = \frac{-8}{2}}}$$

$$\boxed{n = -4}$$

$$16. -\overbrace{(x+3)} + \frac{3}{4}x + 5 = 0$$

$$\underline{\underline{-\frac{1}{4}x - 3 + \frac{3}{4}x + 5 = 0}}$$

$$\underline{\underline{-\frac{1}{4}x + 2 = 0}}$$

$$\underline{\underline{-2 \quad -2}}$$

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

$$\boxed{x = 8}$$

$$18. \overbrace{2(3x-1)} + \overbrace{2(4x+5)} = 8$$

$$\underline{\underline{6x - 2 + 8x + 10 = 8}}$$

$$\underline{\underline{14x + 8 = 8}}$$

$$\underline{\underline{-8 \quad -8}}$$

$$\underline{\underline{\frac{14x}{14} = \frac{0}{14}}}$$

$$\boxed{x = 0}$$