

3.5 Solving Two-Step Equations p.110

The purpose of Algebra is to **isolate the variable** by doing the **inverse operation**. (\times and \div) ($+$ and $-$)

Steps: (pemdas in reverse) [or gemdas]

↳ Grouping symbols $()$ $[\]$ $|a+b|$ $\frac{a+b}{c}$

- **simplify** each side of the equation, if necessary
- **add** or **subtract** the **constant** that is on the same side as the variable (do it on both sides of the equation)
- **multiply** or **divide** the variable to undo what is being done to it
- **box your answer** and check it too by plugging in the solution

Examples:

$$\begin{array}{r}
 1) \quad 3x + 1 = 7 \\
 \quad \quad \underline{-1} \quad \underline{-1} \\
 \quad \quad 3x = 6 \\
 \quad \quad \underline{\div 3} \quad \underline{\div 3} \\
 \quad \quad x = 2
 \end{array}$$

$$\begin{array}{r}
 2) \quad -19 = 2 + 3x \\
 \quad \quad \underline{-2} \quad \underline{-2} \\
 \quad \quad -21 = 3x \\
 \quad \quad \underline{\div 3} \quad \underline{\div 3} \\
 \quad \quad -7 = x
 \end{array}$$

$$\begin{array}{r}
 3) \quad -\frac{n}{3} - 2 = -18 \\
 \quad \quad \underline{+\frac{n}{3}} \quad \underline{+\frac{n}{3}} \quad \underline{+2} \quad \underline{+2} \\
 \quad \quad -2 = -18 \\
 \quad \quad \underline{+16} \quad \underline{+16} \\
 \quad \quad 14 = -16 \\
 \quad \quad \underline{\div (-3)} \quad \underline{\div (-3)} \\
 \quad \quad -\frac{14}{-3} = \frac{-16(-3)}{-3} \\
 \quad \quad \frac{14}{3} = 16 \\
 \quad \quad n = 48
 \end{array}$$

$$\begin{array}{r}
 4) \quad 6 - 3x = 21 \\
 \quad \quad \underline{-6} \quad \underline{-6} \\
 \quad \quad -3x = 15 \\
 \quad \quad \underline{\div (-3)} \quad \underline{\div (-3)} \\
 \quad \quad x = -5
 \end{array}$$

$-\frac{n}{3} \rightarrow \frac{n}{3}$ *move the negative to the number

$$5) \quad \begin{array}{r} -9 - \frac{y}{4} = -12 \\ +9 \quad +9 \\ \hline \end{array} \quad \begin{array}{r} -9 - \frac{y}{4} = -12 \\ +9 \quad +9 \\ \hline (-4) \cdot 4 = -3(-4) \\ -4 \quad -4 \\ \hline \end{array}$$

$y = 12$

$$6) \quad \begin{array}{r} 7 = 6r - 17 \\ +17 \quad +17 \\ \hline 24 = 6r \\ \frac{24}{6} = \frac{6r}{6} \\ 4 = r \end{array}$$

$4 = r$

$$* 7) \quad \begin{array}{r} \frac{k-3}{2} = 4(2) \\ \hline k-3 = 8 \\ +3 \quad +3 \\ \hline k = 11 \end{array}$$

* multiply by the denominator first (2)

$$* (3) \quad \begin{array}{r} \frac{7+j}{3} = 10(3) \\ \hline 7+j = 30 \\ -7 \quad -7 \\ \hline j = 23 \end{array}$$

$$8) \quad \begin{array}{r} -\frac{9}{4}v + \frac{4}{5} = \frac{7}{8} \\ \frac{35}{40} \\ -\frac{4}{5} \quad -\frac{4}{5} = -\frac{32}{40} \\ \hline -\frac{9}{4}v = \frac{7}{40} - \frac{4}{5} \\ \frac{9}{4}v = \frac{7}{40} - \frac{32}{40} \\ \frac{9}{4}v = -\frac{25}{40} \\ v = -\frac{1}{30} \end{array}$$

$v = -\frac{1}{30}$

add

$$(6) \quad \frac{6}{2} = \frac{5+j}{2} \quad \boxed{j=7}$$

$$9) \quad \begin{array}{r} -4.8f + 6.4 = -8.48 \\ -6.4 \quad -6.4 \\ \hline -4.8f = -14.88 \\ -4.8 \quad -4.8 \\ \hline f = 3.1 \end{array}$$

$f = 3.1$

$$(11) \quad \frac{-3+p}{6} = 10 \quad \boxed{p=63}$$