

Name: _____ Date: _____ Period: _____

Solving two-step equations

Goal: Two-Step equations require you to isolate the _____ in _____ steps.

Look at the following problems. Circle or highlight the step you must take first and turn each equation into a one-step equation.

$$\frac{a}{4} + 2 = 6$$

$$9x - 7 = -7$$

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

$$12(x + 1) = 144$$

$$\frac{1}{2}a - 2 = 6$$

$$\frac{3}{x} = \frac{7}{12}$$

Lets work through the next few two-step equations together.

$$2x + 9 = 21$$

$$\frac{r}{10} + 5 = 25$$

$$\frac{n-5}{2} = 5$$

Name: _____ Date: _____ Period: _____

Solving two-step equations

Goal: Two-Step equations require you to isolate the VARIABLE in 2 steps.

Look at the following problems. Circle or highlight the step you must take first and turn each equation into a one-step equation.

$$\begin{array}{r} \frac{a}{4} + 2 = 6 \\ -2 \quad -2 \\ \hline \frac{a}{4} = 4 \\ (4) \frac{a}{4} = 4(4) \\ \frac{a}{1} = 16 \\ a = 16 \end{array}$$

$$\begin{array}{r} 9x - 7 = -7 \\ +7 \quad +7 \\ \hline 9x = 0 \\ \frac{9x}{9} = \frac{0}{9} \\ x = 0 \end{array}$$

$$\begin{array}{r} \frac{x+3}{4} = 7 \\ (4) \frac{x+3}{4} = 7(4) \\ \text{ELIMINATE THE DENOMINATOR} \\ \frac{x+3}{1} = 28 \\ -3 \quad -3 \\ \hline x = 25 \end{array}$$

$$\begin{array}{r} 12(x+1) = 144 \\ 12x + 12 = 144 \\ -12 \quad -12 \\ \hline 12x = -12 \\ \frac{12x}{12} = \frac{-12}{12} \\ x = -1 \end{array}$$

$$\begin{array}{r} \frac{1}{2}a - 2 = 6 \\ +2 \quad +2 \\ \hline \frac{1}{2}a = 8 \\ (\frac{2}{1}) \frac{1}{2}a = 8(\frac{2}{1}) \\ a = 16 \end{array}$$

$$\begin{array}{r} \frac{3}{x} = \frac{7}{12} \quad \text{CROSS MULTIPLY} \\ 36 = 7x \\ \frac{36}{7} = \frac{7x}{7} \\ \frac{36}{7} = x \end{array}$$

WHAT ARE SOME PATTERNS YOU SEE?

Lets work through the next few two-step equations together.

$$\begin{array}{r} 2x + 9 = 21 \\ -9 \quad -9 \\ \hline 2x = 12 \end{array}$$

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

$$\frac{r}{10} + 5 = 25$$

$$\begin{array}{r} \frac{r}{10} + 5 = 25 \\ -5 \quad -5 \\ \hline \frac{r}{10} = 20 \end{array}$$

$$(10) \frac{r}{10} = 20(10)$$

$$r = 200$$

$$\frac{n-5}{2} = 5$$

$$(2) \frac{n-5}{2} = 5(2)$$

$$n-5 = 10$$

$$n-5 = 10$$

$$n = 15$$

Review: Solve each one-step equation

1. $x - 7 = 13$

4. $-6 = \frac{b}{18}$

2. $4 + m = -12$

5. $\frac{1}{2}x = 10$

3. $14b = -56$

Solve each two-step equation

6. $\frac{4}{10}x + 4 = 5$

11. $9x - 7 = -7$

7. $3p - 2 = -29$

12. $\frac{v+9}{3} = 8$

8. $\frac{k-10}{2} = -7$

13. $2(n + 5) = -2$

9. $-9 + \frac{n}{4} = -7$

14. $144 = -12(x + 5)$

10. $\frac{-5+x}{22} = -1$

15. $-10 = -10 + 7m$

Review: Solve each one-step equation

$$1. \begin{array}{r} x - 7 = 13 \\ +7 \quad +7 \\ \hline x = 20 \end{array}$$

ONE
STEPS

$$2. \begin{array}{r} 4 + m = -12 \\ -4 \quad -4 \\ \hline m = -16 \end{array}$$

$$3. \begin{array}{r} 14b = -56 \\ \overline{14 \quad 14} \\ b = -4 \end{array}$$

Solve each two-step equation

$$6. \begin{array}{r} \frac{4}{10}x + 4 = 5 \\ -4 \quad -4 \\ \hline \frac{4}{10}x = 1 \end{array}$$

$$\frac{4}{10}x = 1 \quad \left(\frac{10}{4}\right) \frac{4}{10}x = 1 \left(\frac{10}{4}\right)$$

$$7. \begin{array}{r} 3p - 2 = -29 \\ +2 \quad +2 \\ \hline 3p = -27 \\ \frac{3p}{3} = \frac{-27}{3} \end{array}$$

$$8. \frac{k-10}{2} = -7$$

$$(2) \frac{k-10}{2} = -7(2)$$

$$\begin{array}{r} k-10 = -14 \\ +10 \quad +10 \\ \hline k = -4 \end{array}$$

$$9. -9 + \frac{n}{4} = -7$$

$$\begin{array}{r} +9 \quad +9 \\ \hline \frac{n}{4} = -2 \end{array}$$

$$(4) \frac{n}{4} = -2(4)$$

$$10. \frac{-5+x}{22} = -1$$

$$(22) \frac{-5+x}{22} = -1(22)$$

$$\begin{array}{r} -5+x = -22 \\ +5 \quad +5 \\ \hline -5+x = -22 \\ +5 \quad +5 \\ \hline x = -17 \end{array}$$

WARM UP THE ENGINE!

$$4. \frac{(18)}{-6} = \frac{b}{18}$$

$$\boxed{-108 = b}$$

$$5. \frac{1}{2}x = 10$$

$$\left(\frac{2}{1}\right) \frac{1}{2}x = 10 \left(\frac{2}{1}\right)$$

$$x = \frac{20}{1} = \boxed{20}$$

$$11. \begin{array}{r} 9x - 7 = -7 \\ +7 \quad +7 \\ \hline 9x = 0 \end{array}$$

$$\frac{9x}{9} = \frac{0}{9}$$

$$\boxed{x = 0}$$

$$12. \frac{3v+9}{3} = 8(3)$$

$$\begin{array}{r} v+9 = 24 \\ -9 \quad -9 \\ \hline v = 15 \end{array}$$

$$13. 2(n+5) = -2$$

$$2n+10 = -2$$

$$2n+10 = -2$$

$$2n = -12$$

$$\frac{2n}{2} = \frac{-12}{2}$$

$$\boxed{n = -6}$$

$$14. 144 = -12(x+5)$$

$$\begin{array}{r} 144 = -12x - 60 \\ +60 \quad +60 \\ \hline 204 = -12x \end{array}$$

$$\frac{204}{-12} = \frac{-12x}{-12}$$

$$-17 = x$$

$$15. -10 = -10 + 7m$$

$$\begin{array}{r} +10 \quad +10 \\ \hline 0 = 7m \end{array}$$

$$0 = 7m$$

$$\frac{0}{7} = \frac{7m}{7}$$

$$\boxed{0 = m}$$