NAME: _____   PERIOD: _____   DATE: _____

Homework Problem Set

For Problems 1–8, solve for x. Assume no variables equal 0.

1. $ax + 3b = 2f$	2. $rx + h = -k$	3. $3px = 2q(r - 5)$	4. $\dfrac{x + b}{4} = c$

1. $ax + 3b = 2f$
   $ax = 2f - 3b$
   $x = \dfrac{2f - 3b}{a}$

2. $rx + h = -k$
   $rx = -k - h$
   $x = \dfrac{-k - h}{r}$

3. $3px = 2q(r-5)$
   $x = \dfrac{2q(r-5)}{3p}$

4. $\dfrac{x+b}{4} = c \cdot 4$
   $x + b = 4c$
   $x = 4c - b$

5. $\dfrac{x}{5} - 7 = 2q$	6. $\dfrac{2x}{7} - \dfrac{x}{7} = ab$	7. $\dfrac{3x}{m} - \dfrac{x}{m} = p$	8. $\dfrac{3ax + 2b}{c} = 4d$

5. $\dfrac{x}{5} - 7 = 2q$
   $5\left(\dfrac{x}{5}\right) = (2q+7)5$
   $x = 5(2q+7)$

6. $\dfrac{2x - x}{7} = ab$
   $7 \cdot \dfrac{x}{7} = (ab)7$
   $x = 7(ab)$

7. $\dfrac{3x}{m} - \dfrac{x}{m} = p$
   $m \cdot \dfrac{2x}{m} = p \cdot m$
   $2x = pm$
   $x = \dfrac{pm}{2}$

8. $c\left(\dfrac{3ax + 2b}{c}\right) = 4d \cdot c$
   $3ax + 2b = 4dc$
   $3ax = 4dc - 2b$
   $x = \dfrac{4dc - 2b}{3a}$

$y = mx + b$

Rewrite each linear equation in slope-intercept form.

9. $x = 5y - 1$

$x = 5y - 1$

$\frac{x}{5} + \frac{1}{5} = \frac{5y}{5}$

$\frac{1}{5}x + \frac{1}{5} = y \Rightarrow \boxed{y = \frac{1}{5}x + \frac{1}{5}}$

10. $-4x + y = 17$

$\boxed{y = 4x + 17}$

11. $3x + 6y = 7$

$3x + 6y = 7$

$\frac{6y}{6} = \frac{-3x}{6} + \frac{7}{6}$

$y = -\frac{3}{6}x + \frac{7}{6} \Rightarrow \boxed{y = -\frac{1}{2}x + \frac{7}{6}}$

12. $4y = 8x - 14$

$\frac{4y}{4} = \frac{8x}{4} - \frac{14}{4}$

$\boxed{y = 2x - \frac{7}{2}}$

13. $-y = 2x$

$\frac{-y}{-1} = \frac{2x}{-1}$

Cannot leave negative

$\boxed{y = -2x}$

14. $9x - 7y = 23$

$9x - 7y = 23$

$\frac{-7y}{-7} = \frac{-9x}{-7} + \frac{23}{-7}$

$\boxed{y = \frac{9}{7}x - \frac{23}{7}}$

15. The science teacher wrote three equations on a board that relate velocity, V, distance traveled, d, and the time to travel the distance, t.

$$V = \frac{d}{t} \qquad\qquad t = \frac{d}{V} \qquad\qquad d = Vt$$

Would you need to memorize all three equations? Explain your reasoning.

No, you could just memorize $d = Vt$ since the other equations are obtained from this one by solving for V and t.

Solve for *x* in each equation. <mark>You may want to start with the equations on the right and then solve the equations on the left, using the same patterns.</mark>

Equation Containing More Than One Variable	**Related Equation**
16. Solve $ax + b = d - cx$ for *x*.	17. Solve $3x + 4 = 6 - 5x$ for *x*.

16.

$$ax + b = d - cx$$
$$+cx \qquad\qquad +cx$$

$$ax + cx + b = d$$
$$-b \quad -b$$

$$ax + cx = d - b$$

$$\frac{x(a+c)}{a+c} = \frac{d-b}{a+c}$$

$$\boxed{x = \frac{d-b}{a+c}}$$

17.

$$3x + 4 = 6 - 5x$$
$$+5x \qquad\qquad +5x$$

$$8x + 4 = 6$$
$$-4 \quad -4$$

$$\frac{8x}{8} = \frac{2}{8}$$

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

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18. Solve for *x*.

LCD: bd $\frac{ax}{b} + \frac{cx}{d} = e$

$$bd\left(\frac{ax}{b} + \frac{cx}{d}\right) = e(bd)$$

$$dax + bcx = ebd$$

$$\frac{x(da+bc)}{(da+bc)} = \frac{ebd}{da+bc}$$

$$\boxed{x = \frac{ebd}{da+bc}}$$

19. Solve for *x*.

LCD: 35 $\frac{2x}{5} + \frac{x}{7} = 3$

$$35\left(\frac{2x}{5} + \frac{x}{7}\right) = 3(35)$$

$$14x + 5x = 105$$

$$\frac{19x}{19} = \frac{105}{19}$$

$$\boxed{x = \frac{105}{19}}$$

Spiral REVIEW—Writing Equations and Finding Solutions

20. May and June were running at the track. May started first and ran at a steady pace
    of 1 mile every 11 minutes. June started 5 minutes later than May and ran at a steady
    pace of 1 mile every 9 minutes.

    A. Sketch May and
        June distance-
        versus-time
        graphs on a
        coordinate plane
        at the right.
        Put a title on
        your graph, and
        include a legend.

Distance (miles)
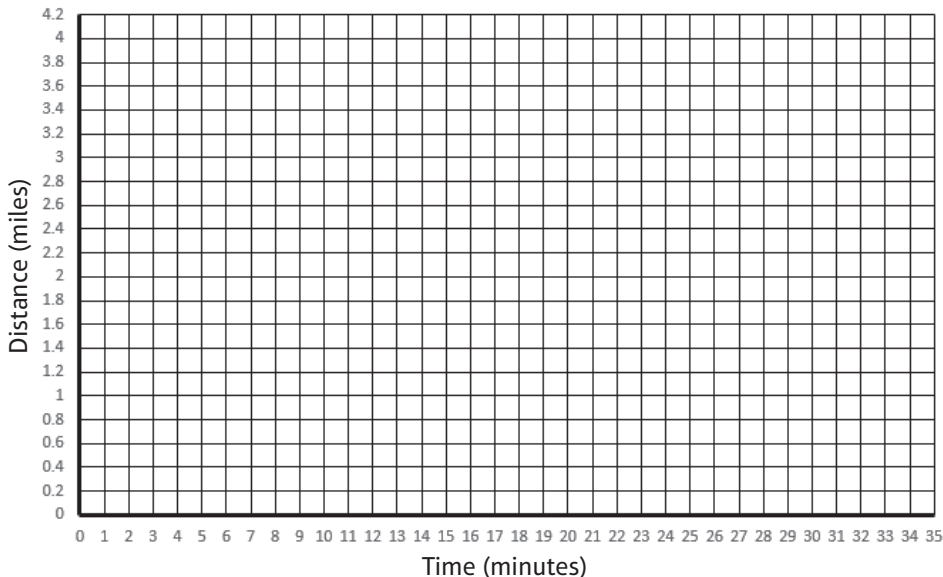
Time (minutes)

    B. **Challenge**   Write linear equations that represent each girl's mileage in terms of time in
        minutes.

    C. Who was the first person to run 3 miles?

    D. Estimate when June passed May.