16 Problems in Finding Linear Functions
(Part 3)

9. The slope of the given line is $\frac{1}{2}$, and our line is perpendicular to the given line. Hence, our slope is the *negative reciprocal*, namely, $m = -\frac{2}{1} = -2$. Now we can use the slope-intercept form equation, $y = mx + b$, to find what b is. We can use the given point, $(-3,6)$, and substitute in the values of x, y, and m:

$$y = mx + b$$

$$6 = -2(-3) + b$$

$$6 = 6 + b$$

$$0 = b$$

Now that we know the slope m and the y-intercept b, we can write the equation of the line:

$$y = -2x + 0 = -2x$$

11.   <u>Step 1:</u> Using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$, we can let $(x_1, y_1) = (3, -8)$ and $(x_2, y_2) = (-3, 0)$. Hence, $m = \frac{0 - (-8)}{-3 - 3} = \frac{0 + 8}{-6} = \frac{8}{-6} = -\frac{4}{3} = \frac{-4}{3}$.

       <u>Step 2:</u> Next we can use the slope-intercept form equation, $y = mx + b$, to find what b is. We can use either given point and substitute in the values of x, y, and m:

$$y = mx + b$$

$$-8 = \frac{-4}{3}(3) + b$$

$$-8 = -4 + b$$

$$-4 = b$$

Now that we know the slope m and the y-intercept b, we can write the equation of the line:

$$y = \frac{-4}{3}x - 4$$

13. The slope of the given line is -1, and our line is perpendicular to the given line. Hence, our slope is the *negative reciprocal*, namely, $m = -\frac{1}{-1} = 1$. Now we can use the slope-intercept form equation, $y = mx + b$, to find what b is. We can use the given point, $(1,10)$, and substitute in the values of x, y, and m:

$$y = mx + b$$

$$10 = 1(1) + b$$

$$10 = 1 + b$$

$$9 = b$$

Now that we know the slope m and the y-intercept b, we can write the equation of the line:

$$y = x + 9$$

15. Step 1: Using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$, we can let $(x_1, y_1) = (2,4)$ and $(x_2, y_2) = (3,9)$. Hence, $m = \frac{9-4}{3-2} = \frac{5}{1} = 5$.

Step 2: Next we can use the slope-intercept form equation, $y = mx + b$, to find what b is. We can use either given point and substitute in the values of x, y, and m:

$$y = mx + b$$

$$4 = 5(2) + b$$

$$4 = 10 + b$$

$$-6 = b$$

Now that we know the slope m and the y-intercept b, we can write the equation of the line:

$$y = 5x - 6$$