Name: _____   Date: _____

Student Success: Think Aloud

In a Think Aloud strategy, you vocalize your thought processes while solving a problem.

PROBLEM: Find the equation of the line perpendicular to the line $y = -2x + 6$ and having an x-intercept of 8.

What am I asked to find?
The equation of a line.
The equation of a line has the form $y = mx + b$.
So, I need the value of the slope and the y-intercept.
I don't have either one given to me.
I'll try to find the slope first.

What information do I have?
The line I want is perpendicular to $y = -2x + 6$.
I know the slope of this line is –2.
I know that the line I want is perpendicular to this one.
Perpendicular lines have slopes that are negative reciprocals of each other.
So, the slope of the line I want must be $\frac{1}{2}$.

Now, I know that my line is $y = \frac{1}{2}x + b$.
I still need to find the value of b.

What other information do I have in the problem?
The x-intercept of the line I want is 8.
But I need the y-intercept.
An x-intercept is a point, the point where the line crosses the x-axis.
Any point on the x-axis can be written as (something, 0).
So, this x-intercept of 8 is the same as the point (8, 0).

How can I use this point to find the value of b?
The point (8, 0) is on the line I want.
So, if I substitute 8 for x and 0 for y in $y = \frac{1}{2}x + b$ I can figure out the value of b.

$$0 = \frac{1}{2}(8) + b$$

Solve this equation for b.
$$0 = 4 + b$$
$$-4 = b$$

So, the y-intercept of my line is –4.
The equation of the line I want must be $y = \frac{1}{2}x - 4$.

How can I check to make sure that I'm right?

I could graph both this line and the line $y = -2x + 6$ to make sure they're parallel.

Then, I can verify that the *x*-intercept of my line is 8.

It would be easiest to do this on a graphing calculator.

If I don't have one, I could find the *x*-intercept of my line by substituting 0 for *y* and solving, and make sure that the product of the slopes of the two lines is −1.

This would make sure the two lines are perpendicular and that my line satisfies both conditions in the problem.