Consider the question below:

If one circle has a diameter of 6 and a second circle has a diameter that is 3 times longer than the diameter of the first circle, what is the area of the larger of these two circles?

A. 18π

B. 27π

C. 36π

D. 81π

E. 324π

This question seems straight-forward enough, but it is riddled with potential dichotomy errors. First, you are asked for the area of a circle and only given information about diameters. Area can be confused with circumference and diameter can be confused with radius.

The formula for the area of a circle is πr^2, so working with diameters can lead to a mistake if you're not careful. To make matters worse, there are two acceptable formulas for the circumference of a circle, $2\pi r$ and πd, the second of which is tempting to use if you know a diameter.

Ultimately, you should recognize that the larger circle has a diameter of 18 (3 times 6), and therefore it has a radius of 9. Plugging that 9 into πr^2 yields an area of 81π.

Had you used the diameter of the larger circle in the area formula, the wrong choice 324π is waiting for you. If, instead, you calculated the larger circle's circumference by mistake, you'll find 18π lying in wait. Other similar errors will lead to the remaining incorrect choices.

Let's look at another:

What is the *x*-intercept of a line in the *xy*-coordinate plane that contains the points (5, 10) and (2, 1)?

A. $\left(0, \frac{5}{3}\right)$

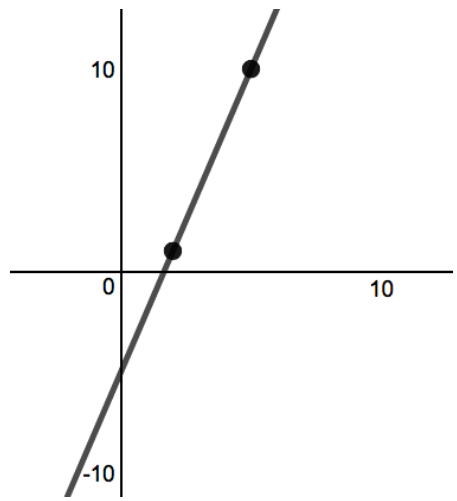
B. $(0, -5)$

C. $\left(\frac{5}{3}, 0\right)$

D. $(3, -5)$

E. $(3, 0)$

A smart move to begin this problem is to draw a rough sketch of a pair of axes, the two indicated points, and the line that connects those points:



Based on this sketch, it should be clear that the only choice that could be the *x*-intercept is C. $\left(\frac{5}{3}, 0\right)$

That point is both on the *x*-axis and to the left of the point (2, 1), as the line indicates it should be.

But here come the possible dichotomy errors again. First, without taking a second to think about, you could easily mistake the concept of *x*-intercept with that of *y*-intercept and pick choice B. Also, there's always that threat of thinking that choice A is a point on the *x*-axis when it is really on the *y*-axis.