Find the Equation

GL08-V1 · storyboard · GL08 The equation of a line. Read each picture with its sentences.

Picture 1

The line through $(0, 4)$ and $(5, -3)$, in standard form.

$$m = \frac{-3-4}{5-0} = -\frac{7}{5}$$ slope first

$$y - 4 = -\frac{7}{5}(x - 0)$$ point-slope, with $(0, 4)$

$$5y - 20 = -7x$$ times 5: no fractions

$$\boxed{7x + 5y = 20}$$ standard form

Check: $7(5) + 5(-3) = 35 - 15 = 20$ ✓

1. Find the line through 0, 4 and 5, negative 3, in standard form.
2. Slope first: negative 3 minus 4, over 5 minus 0, is negative 7 fifths.
3. A point x, y on the line has the same slope from 0, 4.
4. So y minus 4 equals negative 7 fifths times x minus 0, using any point of the line.
5. Multiply both sides by 5: 5 y minus 20 equals negative 7 x.
6. Collect x and y on the left: 7 x plus 5 y equals 20.
7. That is standard form: whole numbers, and a positive x.
8. Now check with the other point: 7 times 5 plus 5 times negative 3 is 20.

Picture 2

Trap through $(-2, 4)$

$\times$ $y - 4 = m(x - 2)$

✓ $y - 4 = m(x + 2)$

9. Watch for the trap: a sign slip with a negative coordinate.
10. Through negative 2, 4, it is x minus negative 2, which is x plus 2.