A Ratio From an Equation

RP07-V1 · storyboard · RP07 Find a ratio from an equation. Read each picture with its sentences.

Picture 1

$$\frac{10x-3y}{13x-2y}=\frac{3}{5}.\ \text{Find}\ \frac{x}{y}.$$

$$5(10x-3y)=3(13x-2y)$$ cross-multiply

$$50x-15y=39x-6y$$

$$11x=9y$$ collect

$$\boxed{\frac{x}{y}=\frac{9}{11}}$$ divide by $11y$

1. 10x − 3y over 13x − 2y equals three fifths.
2. Find x over y.
3. Cross-multiply: 5 times the whole top, and 3 times the whole bottom.
4. Multiply every term: 50x − 15y = 39x − 6y.
5. Collect: take 39x from both sides, and add 15y.
6. 11x = 9y.
7. Divide both sides by 11y: x over y is nine elevenths.

Picture 2

Trap $11x = 9y$

$$\times \quad \frac{x}{y} = \frac{11}{9}$$

$$\checkmark \quad \frac{x}{y} = \frac{9}{11}$$

One equation gives the ratio, not the numbers

$x = 9,\ y = 11 \qquad x = 18,\ y = 22$

8. Watch for the trap: turning the ratio upside down.
9. In 11x = 9y, the 9 goes with x, so x over y is nine elevenths.
10. One equation gives the ratio, not the numbers.
11. 9 and 11 work, and so do 18 and 22.

Picture 3

Trap $5(10x - 3y)$

$\times\ 50x - 3y$

$\checkmark\ 50x - 15y$

12. And don't multiply only the first term: 5 times 10x − 3y is 50x − 15y.
13. Multiply every term.