Slope and Similar Triangles

Pages 115–117

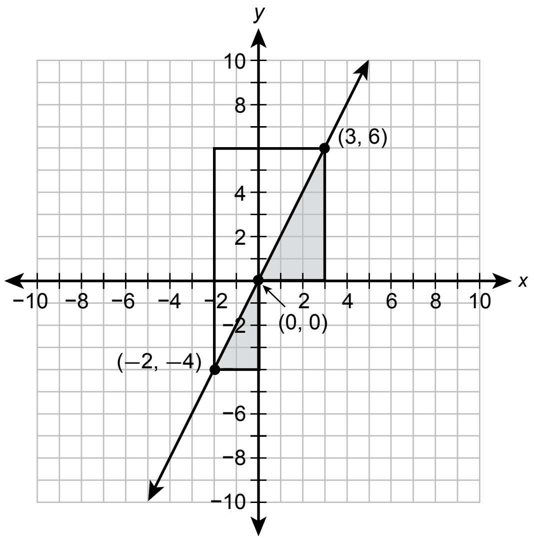
1. **(a)** For the triangle defined by (−6, −4) and (0, −2), $\frac{\text{rise}}{\text{run}} = \frac{-2-(-4)}{0-(-6)} = \frac{2}{6} = \frac{1}{3}$. For the triangle defined by (0, −2) and (6, 0), $\frac{\text{rise}}{\text{run}} = \frac{0-(-2)}{6-0} = \frac{2}{6} = \frac{1}{3}$.

(b) When you are computing the slope of a line, you can choose any two points on the line and you will always get the same slope.

2. **(a)** For the triangle defined by (−2, −10) and (2, −4), $\frac{\text{rise}}{\text{run}} = \frac{-4-(-10)}{2-(-2)} = \frac{6}{4} = \frac{3}{2}$. For the triangle defined by (2, −4) and (8, 5), $\frac{\text{rise}}{\text{run}} = \frac{5-(-4)}{8-2} = \frac{9}{6} = \frac{3}{2}$.

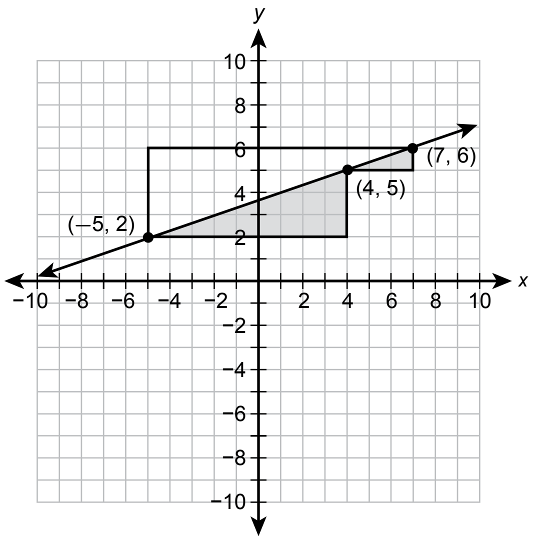
(b) When you are computing the slope of a line, you can choose any two points on the line and you will always get the same slope.

3. **(a)**



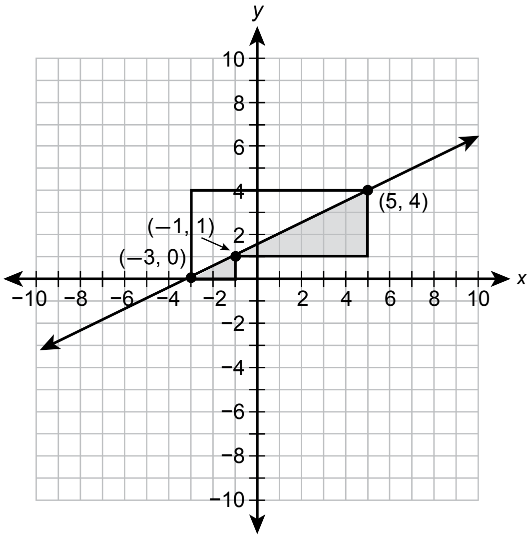
(b) For the triangle defined by (−2, −4) and (0, 0), $\frac{\text{rise}}{\text{run}} = \frac{0-(-4)}{0-(-2)} = \frac{4}{2} = 2$. For the triangle defined by (0, 0) and (3, 6), $\frac{\text{rise}}{\text{run}} = \frac{6-0}{3-0} = \frac{6}{3} = 2$. For the triangle defined by (−2, −4) and (3, 6), $\frac{\text{rise}}{\text{run}} = \frac{6-(-4)}{3-(-2)} = \frac{10}{5} = 2$. Since the ratio of $\frac{\text{rise}}{\text{run}}$ represents the slope of the line, the hypotenuse of each triangle has the same slope, a constant value of 2.

4. **(a)**



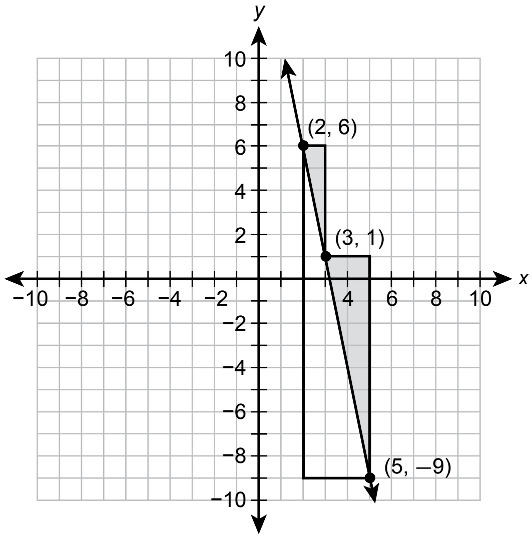
(b) For the triangle defined by (−5, 2) and (4, 5), $\frac{\text{rise}}{\text{run}} = \frac{5-2}{4-(-5)} = \frac{3}{9} = \frac{1}{3}$. For the triangle defined by (4, 5) and (7, 6), $\frac{\text{rise}}{\text{run}} = \frac{6-5}{7-4} = \frac{1}{3}$. For the triangle defined by (−5, 2) and (7, 6), $\frac{\text{rise}}{\text{run}} = \frac{6-2}{7-(-5)} = \frac{4}{12} = \frac{1}{3}$. Since the ratio of $\frac{\text{rise}}{\text{run}}$ represents the slope of the line, the hypotenuse of each triangle has the same slope, a constant value of $\frac{1}{3}$.

5. **(a)**



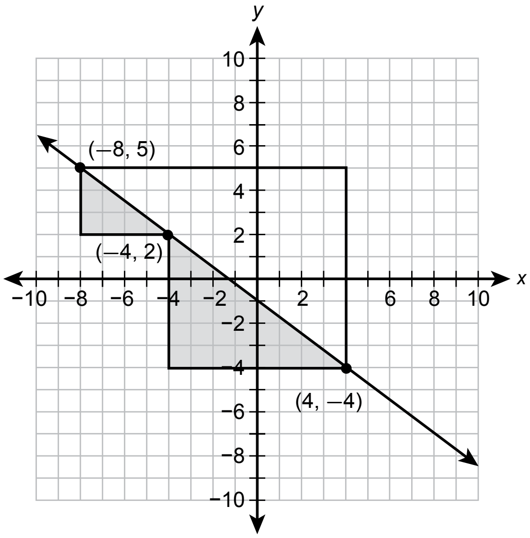
(b) For the triangle defined by $(-3, 0)$ and $(-1, 1)$, $\frac{\text{rise}}{\text{run}} = \frac{1 - 0}{-1 - (-3)} = \frac{1}{2}$. For the triangle defined by $(-1, 1)$ and $(5, 4)$, $\frac{\text{rise}}{\text{run}} = \frac{4 - 1}{5 - (-1)} = \frac{3}{6} = \frac{1}{2}$. For the triangle defined by $(-3, 0)$ and $(5, 4)$, $\frac{\text{rise}}{\text{run}} = \frac{4 - 0}{5 - (-3)} = \frac{4}{8} = \frac{1}{2}$. Since the ratio of $\frac{\text{rise}}{\text{run}}$ represents the slope of the line, the hypotenuse of each triangle has the same slope, a constant value of $\frac{1}{2}$.

6. **(a)**



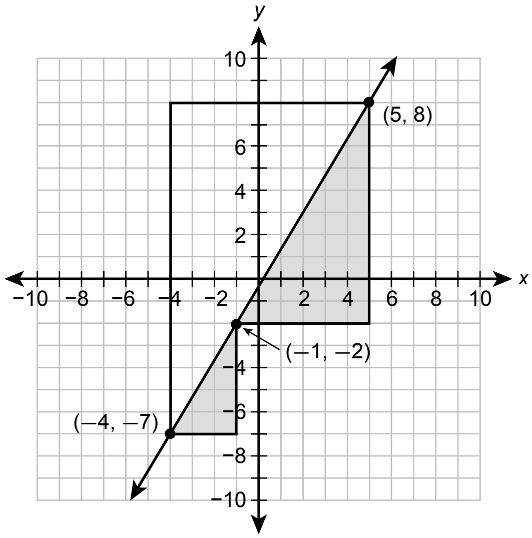
(b) For the triangle defined by $(2, 6)$ and $(3, 1)$, $\frac{\text{rise}}{\text{run}} = \frac{1 - 6}{3 - 2} = \frac{-5}{1} = -5$. For the triangle defined by $(3, 1)$ and $(5, -9)$, $\frac{\text{rise}}{\text{run}} = \frac{-9 - 1}{5 - 3} = \frac{-10}{2} = -5$. For the triangle defined by $(2, 6)$ and $(5, -9)$, $\frac{\text{rise}}{\text{run}} = \frac{-9 - 6}{5 - 2} = \frac{-15}{3} = -5$. Since the ratio of $\frac{\text{rise}}{\text{run}}$ represents the slope of the line, the hypotenuse of each triangle has the same slope, a constant value of -5.

7. **(a)**



(b) For the triangle defined by $(-8, 5)$ and $(-4, 2)$, $\frac{\text{rise}}{\text{run}} = \frac{2-5}{-4-(-8)} = \frac{-3}{4}$. For the triangle defined by $(-4, 2)$ and $(4, -4)$, $\frac{\text{rise}}{\text{run}} = \frac{-4-2}{4-(-4)} = \frac{-6}{8} = -\frac{3}{4}$. For the triangle defined by $(-8, 5)$ and $(4, -4)$, $\frac{\text{rise}}{\text{run}} = \frac{-4-5}{4-(-8)} = \frac{-9}{12} = -\frac{3}{4}$. Since the ratio of $\frac{\text{rise}}{\text{run}}$ represents the slope of the line, the hypotenuse of each triangle has the same slope, a constant value of $-\frac{3}{4}$.

8. **(a)**



(b) For the triangle defined by $(-4, -7)$ and $(-1, -2)$, $\frac{\text{rise}}{\text{run}} = \frac{-2-(-7)}{-1-(-4)} = \frac{5}{3}$. For the triangle defined by $(-1, -2)$ and $(5, 8)$, $\frac{\text{rise}}{\text{run}} = \frac{8 - -2}{5-(-1)} = \frac{10}{6} = \frac{5}{3}$. For the triangle defined by $(-4, -7)$ and $(5, 8)$, $\frac{\text{rise}}{\text{run}} = \frac{8-(-7)}{5-(-4)} = \frac{15}{9} = \frac{5}{3}$. Since the ratio of $\frac{\text{rise}}{\text{run}}$ represents the slope of the line, the hypotenuse of each triangle has the same slope, a constant value of $\frac{5}{3}$.