

Math Lab: Slope of a Staircase Possible Solutions

Procedure

1. The rise of the step is $7\frac{3}{8}$ in. The run of a step is 10 in.

2.
$$\frac{\text{step rise}}{\text{step run}} = \frac{7\frac{3}{8} \text{ in}}{10 \text{ in}} = 0.7375$$

The steepness of the staircase is 0.7375.

3.
$$\frac{\text{total rise}}{\text{total run}} = \frac{88\frac{1}{2} \text{ in}}{120 \text{ in}} = 0.7375$$

The steepness of one step is 0.7375.

4. **a.** Staircase A has a steeper slope.
b. Staircase B has a gentler slope.
c. While the rise is the same for both staircases, the run is longer for Staircase B. This means that the slope for B will be smaller, which makes for a gentler sloping staircase.
5. **a.–c.** Student answers will vary considerably. You should expect to see measurements and calculations similar to those given in questions 1, 2, and 3.

Analysis

6. The rise and run for a single step and for the whole staircase is the same.
7. Assume you want to check the $\frac{\text{rise}}{\text{run}}$ ratio for eight consecutive stairs:

$$\text{total rise} = 8 \times 7\frac{3}{8} = 59 \text{ in}$$

$$\text{total run} = 8 \times 10 = 80 \text{ in}$$

$$\frac{\text{total rise}}{\text{total run}} = \frac{59 \text{ in}}{80 \text{ in}} = 0.7375$$

8. **a.** Student answers will vary. Accept answers that show a realistic comparison.
b. Student answers will vary, but a correct response should show that students realize that a larger slope value means steeper stairs.