Conceptual Activity: Knitting a Scarf

Exploration Questions Sample Responses

a. What do you notice about the graph?

Answers will vary. Students should notice that the graph is linear and increasing, and that the graph represents the growth of the scarf as more rows are added.

b. What do you wonder about the graph?

Answers will vary. Students may wonder about other key features of the graph. For example, students may want to know whether there should be a maximum since a scarf of infinite length would be highly impractical.

c. In your own words, explain what "rate of change" means.

Answers may vary. Students should explain their current understanding of rate of change. For example, students may answer that rate of change measures how much something changes over time.

d. The scarf increased in length by 4 inches from row 10 to row 20. It increased in length by the same amount from row 20 to row 30. Will the length of the scarf change by the same amount each time Grant adds 10 rows? How do you know?

Answers may vary. Students should recognize that the growth pattern of 4 inches per 10 rows is constant and likely to remain so.

e. Predict what the length of the scarf will be at 40 rows.

16 inches

f. The slope of the line in the graph is $\frac{4}{10}$. How is this related to the increase in the length of the scarf as more rows are added?

Answers may vary. Students should recognize that the slope is equivalent to the described rate of change of 4 inches per 10 rows.

g. Consider these two descriptions of the rate at which the length of the scarf increases:

- The scarf grows by 4 inches every 10 rows.
- The scarf grows by $\frac{4}{10}$ of an inch every row.

Which is better? Why?

Answers will vary. The first descriptor uses whole numbers and is easy to understand. The second descriptor uses a per-unit rate, which makes precise calculation on a per-row basis easy.