Comparing Proportional Relationships

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1. The line that represents the distance traveled by Relationship A has a steeper slope than the line that represents the distance traveled by Relationship B. Therefore, Relationship A is moving at a faster rate.

2. In the equation $y = 2.6x$, the slope is 2.6. Therefore, Relationship A is moving at a rate of 2.6 units/time period. In the equation $y = 2.8x$, the slope is 2.8. Therefore, Relationship B is moving at a rate of 2.8 units/time period. Since $2.8 > 2.6$, Relationship B is moving at a faster rate than Relationship A.

3. Determine Relationship A's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (10, \$102.50) and (14, \$143.50).

   slope: $m = \frac{\$143.50 - \$102.50}{14 - 10} = \frac{\$41}{4} = \$10.25$;

   The rate at which Relationship A is paid is \$10.25/h. Determine Relationship B's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (8, \$92) and (12, \$138).

   slope: $m = \frac{\$138 - \$92}{12 - 8} = \frac{\$46}{4} = \$11.50$; The rate at which Relationship B is paid is \$11.50/h. Since $\$11.50 > \$10.25$, Relationship B is being paid at a greater rate than Relationship A.

4. Determine Relationship A's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (3, \$4.47) and (5, \$7.45).

   slope: $m = \frac{\$7.45 - \$4.47}{5 - 3} = \frac{\$2.98}{2} = \$1.49$; The cost per pound for potatoes in Relationship A is \$1.49. In the equation $y = 1.56x$, the slope is 1.56. Therefore, in Relationship B the cost per pound for potatoes is \$1.56. Since $\$1.56 > \$1.49$, the cost per pound for potatoes is greater in Relationship B than it is in Relationship A.

5. Determine Relationship A's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (2, 94) and (5, 235).

   slope: $m = \frac{235 - 94}{5 - 2} = \frac{141}{3} = 47$; The number of words that can be typed per minute in Relationship A is 47. Determine Relationship B's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (4, 156) and (7, 273).

   slope: $m = \frac{273 - 156}{7 - 4} = \frac{117}{3} = 39$; The number of words that can be typed per minute in Relationship B is 39. Since $47 > 39$, the number of words that can be typed per minute in Relationship A is greater than that in Relationship B.

6. Determine Relationship A's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (4, 1400) and (6, 2100).

   slope: $m = \frac{2100 - 1400}{6 - 4} = \frac{700}{2} = 350$; The cost of tuition per student in Relationship A is \$350. In the equation $y = 385x$, the slope is 385. Therefore, in Relationship B the cost of tuition per student is \$385. Since $\$385 > \$350$, the cost of tuition per student in Relationship B is greater than it is in Relationship A.

7. The line that represents the cost per box of Cereal B has a steeper slope than the line that represents the cost per box of Cereal A. Therefore, Cereal A is less expensive.

8. **(a)** Determine Andrew's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (2.5, 30) and (4.25, 51).

slope: $m = \frac{51 - 30}{4.25 - 2.5} = \frac{21}{1.75} = 12$; Andrew can stock 12 shelves in an hour. Determine Marcus's rate by choosing two points and using these points and the slope formula to find the slope. For example, choose points (3, 28.5) and (4, 38).

slope: $m = \frac{38 - 28.5}{4 - 3} = \frac{9.5}{1} = 9.5$; Marcus can stock 9.5 shelves in an hour.

(b) Since $12 > 9.5$, Andrew can stock more shelves per hour than Marcus can.

9. In the equation $y = 4x$, the slope is 4. Therefore, on the science test each question is worth 4 points. Determine the point value of each question on the math test by choosing two points and using these points and the slope formula to find the slope. For example, choose points (5, 30) and (12, 72).

slope: $m = \frac{72 - 30}{12 - 5} = \frac{42}{7} = 6$; On the math test each question is worth 6 points. Since $6 > 4$, the questions on the math test are worth more than the questions on the science test.

10. In the equation $y = 65x$, the slope is 65; therefore, the resting heart rate of a healthy cow is 65 beats/min. Determine the resting heart rate of a healthy adult horse by choosing two points and using these points and the slope formula to find the slope. For example, choose points (4, 152) and (7, 266).

slope: $m = \frac{266 - 152}{7 - 4} = \frac{114}{3} = 38$; The resting heart rate of a healthy adult horse is 38 beats/min. Since $65 > 38$, a healthy adult cow has a faster resting heart rate than a healthy adult horse.