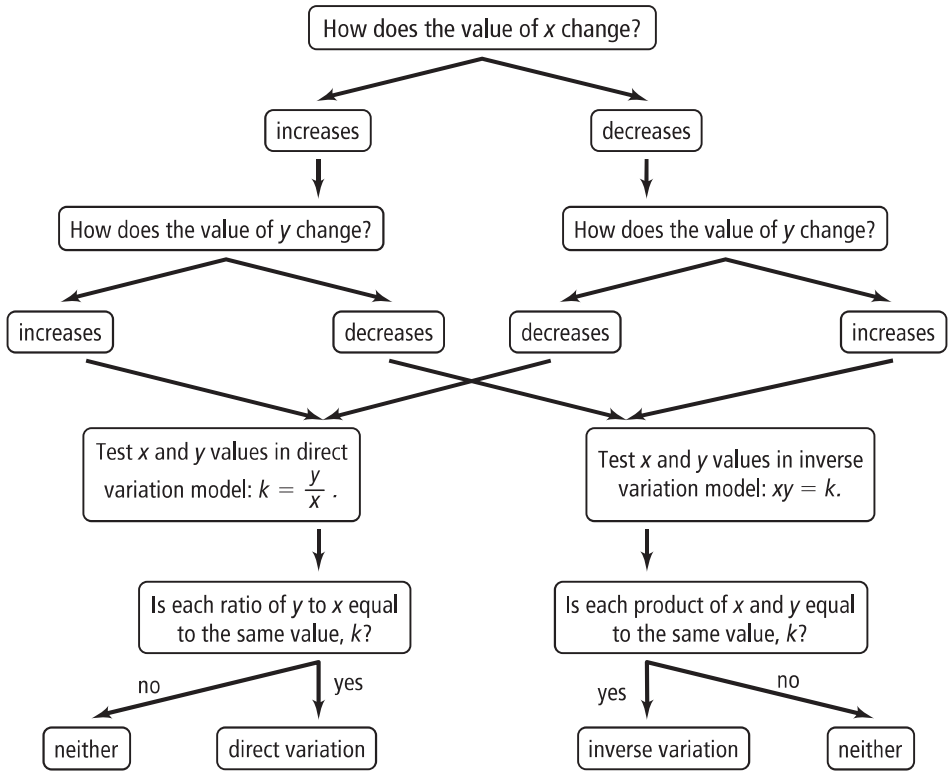
Name _____ Class _____ Date _____

8-1 Reteaching

Inverse Variation

The flowchart below shows how to decide whether a relationship between two variables is a direct variation, inverse variation, or neither.



Problem

Do the data in the table represent a direct variation, inverse variation, or neither?

x	1	2	4	5
y	20	10	5	4

As the value of x increases, the value of y decreases, so test the table values in the inverse variation model: $xy = k$: $1 \cdot 20 = 20$, $2 \cdot 10 = 20$, $4 \cdot 5 = 20$, $5 \cdot 4 = 20$. Each product equals the same value, 20, so the data in the table model an inverse variation.

Exercises

Do the data in the table represent a direct variation, inverse variation, or neither?

1.

x	5	10	15	20
y	10	20	30	40

direct variation

2.

x	1	3	4	6
y	12	4	3	2

inverse variation

8-1 Reteaching (continued)

Inverse Variation

To solve problems involving inverse variation, you need to solve for the constant of variation k before you can find an answer.

Problem

The time t that is necessary to complete a task varies inversely as the number of people p working. If it takes 4 h for 12 people to paint the exterior of a house, how long does it take for 3 people to do the same job?

$t = \frac{k}{p}$ Write an inverse variation. Because time is dependent on people, t is the dependent variable and p is the independent variable.

$4 = \frac{k}{12}$ Substitute 4 for t and 12 for p.

$48 = k$ Multiply both sides by 12 to solve for k, the constant of variation.

$t = \frac{48}{p}$ Substitute 48 for k. This is the equation of the inverse variation.

$t = \frac{48}{3} = 16$ Substitute 3 for p. Simplify to solve the equation.

It takes 3 people 16 h to paint the exterior of the house.

Exercises

3. The time t needed to complete a task varies inversely as the number of people p. It takes 5 h for seven men to install a new roof. How long does it take ten men to complete the job? **3.5 h**

4. The time t needed to drive a certain distance varies inversely as the speed r. It takes 7.5 h at 40 mi/h to drive a certain distance. How long does it take to drive the same distance at 60 mi/h? **5 h**

5. The cost of each item bought is inversely proportional to the number of items when spending a fixed amount. When 42 items are bought, each costs \$1.46. Find the number of items when each costs \$2.16. **about 28 items**

6. The length l of a rectangle of a certain area varies inversely as the width w. The length of a rectangle is 9 cm when the width is 6 cm. Determine the length if the width is 8 cm. **6.75 cm**