Name	Period	Date
Math 2: Variations		

Write the formula for each variation. Solve.

- **1.** If y varies directly as the square of x and y = 6 when x = 4, then find y when x = 8.
- **2.** If y varies jointly as x and z and y = 90 when x = 2 and z = 5. Find y when x = 108 and $z = \frac{1}{4}$.
- **3.** If *y* varies directly as *x* and inversely as *z* and *y* = 8 when *x* = 80 and *z* = 5, find *y* when x = 20 and z = 8.
- 3. If y varies inversely as the cube of x and y = 5 when x = 4, find y when x = 2.

- 5. If y varies directly as x and inversely as z and y = 8 when x = 56 and z = 21, find y when x = 35 and z = 5.
- **6.** The distance between two points measured on a map varies directly with the actual distance. If 1 cm represents 12 km, how many kilometers are represented by 5 cm.

7. When a bicycle is being pedaled in a certain gear, it travels 10 m for every 4 revolutions. If the number of meters traveled varies directly with the number of revolutions, how far will a bicycle travel if the pedal makes 200 revolutions?

- **8.** The electrical resistance R of a wire varies directly as the length / of the wire and inversely as the square of the diameter d. If 20 m of wire with a diameter of 1.5 mm has a resistance of 12 ohms, what is the resistance of 20 m of the same type of wire if the diameter is increased to 2 mm?
- **9.** The luminance expressed in lux (lx) of an electric bulb above a flat surface is inversely proportional to the square of the distance to the surface. If the luminance is 4.5 lx when the bulb is 4 m from the surface, what is the luminance when the bulb is 3 m from the surface?
- **10.** A concrete supplier has determined that the area an amount of concrete will cover is inversely proportional to the depth of the concrete. For a depth of 1 ft, the supplier will cover an area of 300 ft². Find the depth when the supplier needs to cover 900 ft².
- **11.** The volume of a cone varies jointly as its height and the square of its base radius. A cone of base radius measuring 5 cm, height measuring 5 cm and the volume measuring 15π . In terms of π , find the volume when the base radius remains the same and the height changes to 10 cm.
- **12.** According to Newton's Law of Universal Gravitation, the weight of an object is inversely proportional to the square of its distance from the center of the Earth. The Earth has a radius of 22,000 miles. If an astronaut weighs 135 pounds on Earth, what is her weight when she is 6,000 miles above the Earth's surface?
- 13. The distance a bolt of lightning if from you varies directly as the number of seconds that you count after you hear the thunder. Suppose you count 10 seconds when the lightning is 2 miles away from you. How long would you count if the lightning were 15 miles away from you?
- **14.** The time required for a team of road workers to dig a ditch is directly proportional to the length of the ditch and inversely proportional to the number of people digging. It takes 10 workers 5 hours to dig a 100-yard ditch. How many hours would it take 20 workers to dig a 1700-yard ditch?