Name __Key__   Date _____ Period ____

7.1 Direct & Inverse Variation CYU

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Finding the constant of variation, k	1 - 3	4 - 6	8, 9, 10
Writing a direct variation equation	1 - 3	4 – 6	9, 10
Writing an inverse variation equation	7		9
Predicting using a variation equation	1 – 3, 7	4 - 6	8 - 10
Combined variation equation			9

Solve for the constant of variation. Write the variation equation or function. The predict using your variation equation. Be sure to show all work to earn full credit and use proper units with your final answer.

1. If ducks that are captured, tagged, and then released **varies directly** as ducks that are examined. In a wild life preserve, 60 ducks are captured, tagged, and then released. Later, 200 ducks are examined, and three of the 200 ducks are found to have tags. Estimate the number of ducks in the preserve.

   4000 ducks

   $K = \dfrac{3}{200}$

   $y = \dfrac{3}{200}x$

2. If height when standing **varies directly** as height when kneeling. Leonardo da Vinci studied human proportions so that his drawings would be more accurate. He observed that the height of a person kneeling was approximately three fourths of that person's height when standing. Using this information, find the approximate height of a person whose kneeling height is 4 ft. (round to the nearest tenth)

   5.3 ft

   $K = \dfrac{4}{3}$

   $y = \dfrac{4}{3}x$

3. The profit (P) realized by a company **varies directly** as the number of products it sells (s). If a company makes a profit of $2500 on the sale of 20 products, what is the profit when the company sells 300 products?

   $K = 125$ $y = 125x$

   $P = 125\,s$

   P = $ 37,500

4. The period (p) of a pendulum, or the time it takes for the pendulum to make one complete swing, **varies directly** as the square root of the length (L) of the pendulum. If the period of a pendulum is 1.5 s when the length is 2 ft, find the period when the length is 4.5 ft. (round to the nearest hundredth)
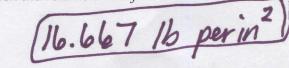
   $K = 1.061$ $P = 1.061\sqrt{L}$ **P = 2.25 s**

5. The distance (s) a ball will roll down an inclined plane is **directly proportional** to the square of the time (t). If the ball rolls 5 ft in 1 s, how far will it roll in 4 s?

$k = 5$ $S = 5t^2$ $\boxed{80 \text{ ft}}$

6. The stopping distance (s) of a car **varies directly** as the square of its speed (v). If a car traveling 30 mph requires 60 ft to stop, find the stopping distance for a car traveling 55 mph. (round to the nearest tenth)

$K = 0.067$ $S = 0.067v^2$ $\boxed{202.7 \text{ ft}}$

7. For a constant temperature, the pressure (P) of a gas **varies inversely** as the volume (V). If the pressure is 25 pounds per square inch when the volume is 400 ft^3 , find the pressure when the volume is 150 ft^3 .

$K = 10,000$ $P = \dfrac{10\,000}{V}$ $\boxed{16.667 \text{ lb per in}^2}$

8. The pressure (p) in a liquid **varies directly** as the product of the depth (d) and the density (D) of the liquid. If the pressure is 37.5 pounds per square inch when the depth is 100 in. and the density is 1.2 pounds per square inch, find the pressure when the density remains the same and the depth is 60 in.

$K = 0.3125$ $P = 0.3125\,dD$ $\boxed{P = 22.5 \text{ lb per in}^2}$

9. The resistance of a wire **varies directly** as the length (L) of the wire and **inversely** as the square of the diameter (d). If the resistance is 9 ohms in 50 ft of wire that has a diameter of 0.05 in., find the resistance in 50 ft of a similar wire that has a diameter of 0.02 in.

$k = 0.00045$ $R = \dfrac{(0.00045)L}{d^2}$ $\boxed{56.25 \text{ Ohms}}$

10. The wind force (w) on a vertical surface **varies directly** as the product of the area (A) of the surface and the square of the wind velocity (v). When the wind is blowing at 30 mph, the force on an area of 10 ft sq is 45 lb. Find the force on this area when the wind is blowing at 60 mph.

$K = 0.005$ $W = (0.005)Av^2$ $\boxed{180 \text{ lbs}}$

CYU Reflection: *How far can you go: basic, intermediate, or advanced?*
Rate your mastery level!
How confident are you with the skills this CYU covered? Circle the score you would give yourself.

1	2	3	4	5	6	7	8
Basic		Intermediate			Advanced		Solved ALL!