

Compression Ratio Lesson 2 Quiz

Name

Key

Solve the following by creating a model and using it to solve for the indicated variable.

1. A driver wants to rebuild the engine in a car with a piston displacement of 612 cc and a chamber volume of 35 cc. If the driver changes the piston displacement to 630 cc, would the compression ratio increase or decrease?

changed

$$CR = \frac{PD + CV}{CV}$$

$$CR = \frac{630 + 35}{35}$$

original $CR = \frac{612 + 35}{35}$

$$CR = \frac{665}{35}$$

$$CR = \frac{647}{35}$$

$$CR = 19 \text{ to } 1 \text{ Increase}$$

$$CR = 18.5 \text{ to } 1$$

2. A driver wants to rebuild the engine in a car with a piston displacement of 525 cc and a chamber volume of 50 cc. If the driver changes the chamber volume to 45 cc, would the compression ratio increase or decrease?

changed

$$CR = \frac{PD + CV}{CV}$$

$$CR = \frac{525 + 45}{45}$$

original $CR = \frac{525 + 50}{50}$

$$CR = \frac{570}{45}$$

$$CR = \frac{575}{50}$$

$$CR = 12.7 \text{ to } 1 \text{ Increase}$$

$$CR = 11.5 \text{ to } 1$$

3. The volume of a cylinder varies jointly with the radius squared and height. The constant of variation is π . Write the model and determine the volume of a cylinder if the radius is 6.5 inches and the height is 4 inches.

$$\text{Volume} = \pi \text{ radius}^2 \cdot \text{height}$$

$$V = \pi r^2 h$$

$$V = \pi 6.5^2 (4)$$

$$V = 530.9 \text{ in}^3$$

4. If y varies directly as x and inversely as z with a constant of variation of 2, write the model. What would y be if $x = 25$ and $z = 4$.

$$y = \frac{2x}{z}$$

$$y = \frac{2(25)}{4}$$

$$y = 12.5$$

5. Horsepower (Hp) varies jointly as the distance traveled (d in feet) and the weight (w in pounds) with a constant of variation of $\frac{1}{33000}$. Write the model for horsepower and use it to calculate the horsepower needed to move a 2000-pound object a 100 feet.

$$Hp = \frac{1}{33000} \cdot dw$$

$$Hp = \frac{dw}{33000}$$

$$Hp = \frac{100(2000)}{33000}$$

$$Hp = 6.1 \text{ horsepower}$$