

21.

T	R
7.6	5.8
30	15
380	78
930	143

*(Note: Red circles and arrows in the original image connect the values 30, 380, 930 in the T column and 15, 78, 143 in the R column, with a multiplier of 31 on the left and 9.53 on the right.)*

$$9.53^x = 31$$

$$\log 9.53^x = \log 31$$

$$x \log 9.53 = \log 31$$

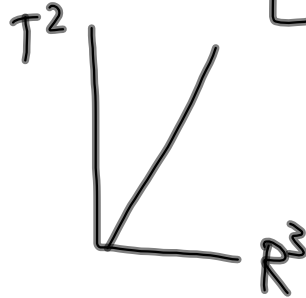
$$x = \frac{\log 31}{\log 9.53}$$

$$x \doteq 1.5$$

$$T \propto R^{1.5}$$

$$T \propto R^{\frac{3}{2}}$$

$$T^2 \propto R^3$$



91-8 Using Proportioning Techniques in Physics

• Forming Equations from Proportionalities:

$$\begin{aligned}
 R \propto \frac{1}{d^2} \\
 R \propto l
 \end{aligned}
 \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{combine: } R \propto l \left( \frac{1}{d^2} \right)$$

$$R \propto \frac{l}{d^2} \quad (\text{proportionality})$$

$$R = \frac{k l}{d^2} \quad (\text{general equation})$$

$$k = \frac{R d^2}{l} \quad (\text{solve for } k)$$

*\* k has units \**

$$R = \frac{12 l}{d^2} \quad (\text{specific equation})$$

• Getting a Proportionality from the Equation

$$F = \frac{G m_1 m_2}{r^2}$$

$$\begin{aligned}
 F &\propto m_1 \\
 F &\propto m_2 \\
 F &\propto \frac{1}{r^2}
 \end{aligned}$$

• Solving Problems using Proportionalities

SP1  $F \propto v^2$  let  $F'$  be the new force  
 $3v$  be the new speed.

$$F = k v^2$$

$$F' = k (3v)^2$$

$$F' = k 9 v^2$$


$$F' = 9 k v^2$$

$$F' = 9 F$$

The new force will be 9x greater than the original.

SP2

$V = 1.0 \times 10^5 L$   
 dimensions doubled  
 $V' = ?$



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

$V'$  is the new volume  
 $2r$  is the new radius  
 $2h$  is the new height

$$V' = \pi (2r)^2 (2h)$$

$$V' = \pi (4r^2) (2h)$$

$$V' = 8 \pi r^2 h$$

$$V' = 8 V$$

$$V' = 8 (1.0 \times 10^5 L)$$

$$\boxed{V' = 8.0 \times 10^5 L}$$

To DO:

- ① PP/30 (FOP)
- ② Assignment:  
 p 38 | 28 - 34 (ADV 35 + 36) (FOP)

**DUE TUES**