

$$P = \frac{F}{A}$$

(Pa) ← F (N) ← UNITS!
 (m²) ← A

Pressure Practice



Instructions: Using the following formula $P = F/A$, answer the below word problems. Be sure to show all work and write all units.

1. Calculate the pressure on a man's foot when a woman who weighs 520 N steps on his foot with her heel which has an area of 0.001 m² with all of her weight.

$$P = \frac{F}{A} = \frac{520 \text{ N}}{0.001 \text{ m}^2} = 520\,000 \text{ Pa} \text{ OR } 520 \text{ kPa}$$

2. Calculate the pressure exerted on the floor when an elephant who weighs 2400 N stands on one foot which has an area of 0.4 m².

$$P = \frac{F}{A} = \frac{2400 \text{ N}}{0.4 \text{ m}^2} = 6000 \text{ Pa} \text{ OR } 6 \text{ kPa}$$

3. How much must a woman weigh (force) if the pressure she exerts while standing on one foot has an area of 0.6 m² exerts a pressure of 16 Pa?

$$P = \frac{F}{A} \rightarrow F = A \cdot P = 0.6 \text{ m}^2 \cdot 16 \text{ Pa} = 9.6 \text{ N}$$

4. What is the area of a car that touches the road if the car's weight on one tire is 28 kN and the pressure exerted on the road by one tire is 700 kPa?

Weight $F = 28 \text{ kN} = 28\,000 \text{ N}$
 Pressure $P = 700 \text{ kPa} = 700\,000 \text{ Pa}$

$$P = \frac{F}{A} \rightarrow A = \frac{F}{P} = \frac{28\,000 \text{ N}}{700\,000 \text{ Pa}} = 0.04 \text{ m}^2$$

For all 4 tires
 $A = 0.04 \text{ m}^2 \times 4 = 0.16 \text{ m}^2$

5. How much pressure will be exerted on a diver's body which has an area of 10 m², if the water column above him weighs 120 000 N?

$$P = \frac{F}{A} = \frac{120\,000 \text{ N}}{10 \text{ m}^2}$$

$$P = 12\,000 \text{ N} \text{ OR } 12 \text{ kN}$$

#4 was edited from the version handed out in class