

Pressure

Answer the Following Questions.

1. (Walker, p. 495, #2) What weight of water is required to fill a 25-gallon aquarium? (1 gallon = 8 lbs) (Give your answer in Newtons)

889N

2. (Walker, p. 495, #1) Determine the weight of the air in this classroom which is 14 x 8 x 3.75 meters. Assume the room is at 20°C

4955N

3. A person's foot is roughly 8cm wide and 30cm long. If a person has a mass of 85 kg, what is the pressure that this person applies to the ground when standing in one place?

17354Pa

4. If this same person was wearing skis that were 160cm long by 10 cm wide. How much pressure would they be placing on ground.

5206.25Pa

5. What if they were wearing snow shoes which are 23 cm by 75 cm. How much pressure do they exert?

4828Pa

6. (Walker, Chapter 15) A 100-kg person sits on a 5-kg bicycle. The weight is borne equally by the two wheels of the bicycle. The tires are inflated to a gauge pressure of 8.0×10^5 Pa and are 2.0 cm wide. What length of each tire is in contact with the ground?

3.2 cm

7. A car tire is inflated to 220 kPa. If each tire is in contact with the 100cm^2 of the road. What is the mass of the car and its occupants?

8800 kg

8. (Walker, Chapter 15) The deepest point of the Pacific Ocean is 11,033 m, in the Mariana Trench. What is the water pressure at that point? The density of seawater is 1025 kg/m^3 .

$1.1 \times 10^8 \text{ Pa}$

9. (Walker, p. 493, #3) Two drinking glasses, A and B, are filled with water to the same depth. Glass A has twice the diameter of glass B. **(a)** Compare the weight of water in the two glasses. **(b)** Compare the pressure at the bottom of the two glasses. **(c)** Are your answers to parts (a) and (b) consistent? Explain.

a) same b) Glass B has more pressure

10. (Walker, p. 495, #8) A 67-kg person sits on a 3.5-kg chair. Each leg of the chair makes contact with the floor in a circle that is 1.5 cm in diameter. Find the pressure exerted on the floor by each leg of the chair, assuming the weight is evenly distributed.

$2.32 \times 10^6 \text{ Pa}$

11. (Walker, p. 495, #9) To prevent damage to floors (and to increase friction), a crutch will often have a rubber tip attached to its end. If the end of the crutch is a circle of radius 1.2 cm without the tip, and the tip is a circle of radius 2.5 cm, by what factor does the tip reduce the pressure exerted by the crutch?

Name: _____
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Chapter 4: Force and the Law of Motion

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