

Read 9.3

Exam 3
Clickers
group } updated on D2L
please check

Makeup Exam April 30th 7 p.m

material from Exams 1, 2, 3

Drop lowest Exam

Drop lowest group

Last H.W Bonus

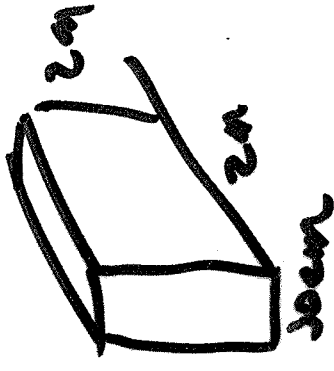
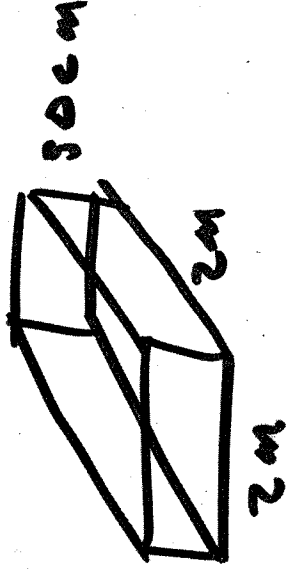
weeks worth of clicker points

Problem: A water bed is 2.00 m square and 30.0 cm deep

(a) What is the weight of the water it holds?

(b) What pressure does the bed exert on the floor, assuming the whole bottom surface touches the floor?

$$\rho = \frac{m}{V}$$



$$m = \rho V$$

$$\rho_{\text{water}} = 1 \text{ g/cm}^3$$

$$\text{kg/m}^3$$

$$\frac{1 \text{ g}}{\text{cm}^3} \times \frac{1000 \text{ kg}}{1 \text{ m}^3} \times \frac{100 \text{ cm}^3}{1 \text{ m}^3} = 1000 \text{ kg/m}^3$$

$$m = (1000 \text{ kg/m}^3) (2 \text{ m} \times 2 \text{ m} \times 0.3 \text{ m}) = 1200 \text{ kg} \quad \text{Volume} \quad w = mg \quad \boxed{w = 11760 \text{ N}}$$

$$P = \frac{F}{A} = \frac{11760 \text{ N}}{(2 \text{ m} \times 2 \text{ m})} = \boxed{2940 \text{ Pa}}$$

Problem: In the hydraulic press used in a trash compactor, the radii of the circular input piston and the circular output plunger are 6.4×10^{-3} m and 5.1×10^{-2} m, respectively.

What force is applied to the trash when the input force is

330 N?

$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$r_1 = 6.4 \times 10^{-3} \text{ m}$$

$$r_2 = 5.1 \times 10^{-2} \text{ m}$$

$$A_1 = \pi r_1^2 = 1.29 \times 10^{-4} \text{ m}^2$$

$$A_2 = \pi r_2^2 = 8.17 \times 10^{-3} \text{ m}^2$$

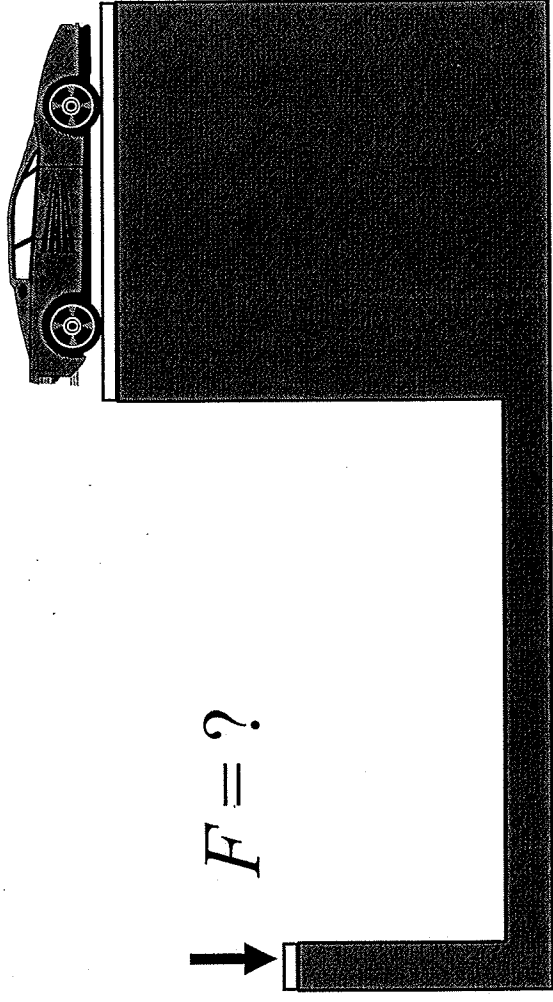
$$F_2 = \frac{A_2}{A_1} F_1 = \frac{8.17 \times 10^{-3} \text{ m}^2}{1.29 \times 10^{-4} \text{ m}^2} (330 \text{ N}) = \boxed{20900 \text{ N}}$$

(A)

Interactive Question

A container filled with oil is fitted with pistons on both ends. The left piston has an area of 10 mm^2 and the right piston lifting the car has an area of $10,000 \text{ mm}^2$. What force must be exerted on the left piston to apply a force of $10,000 \text{ N}$ to the piston lifting the car?

- A) 10 N
- B) 100 N
- C) $10,000 \text{ N}$
- D) 10^6 N
- E) 10^8 N



D

Interactive Question

A hydraulic jack has a mechanical advantage allowing a puny human to lift a car. Which of the following statements is true?

- A) The input force is equal to the output force
- B) The area of the input piston is equal to the area of the output piston
- C) The distances the input and output pistons move are equal
- D) The work done by the output piston is equal to the work done on the input piston