Name:

COLONIAL CHRISTIAN SCHOOL

Pressure Math Page

Instructions: Show all your work. Write the formula first for each problem. Circle your final answer.

P = F/A
1Pa = N/m²
1 lb = 4.45N

I pledge that I have neither given nor received any information beyond that permitted by the instructor, signed:

1. Brianna weighs **520 N** and wears high heels with an area of **0.001 m^2**. The roach does not wear shoes at all. Calculate the pressure on the roach when Brianna steps on it with her heel.

2. Calculate the pressure exerted by Angelina's pet elephant as it stands on one foot during a circus act. The elephant weighs **2400 N** and its foot has an area of **0.4 m^2**.

3. Calculate the pressure exerted on the heel of a Giancarlo's foot as he performs a perfect gymnastic landing in the winter Olympics. Giancarlo weighs **320 N** and his heal has an area of **0.16 m^2**.

4. How much must Hannah weigh if the pressure she exerts while standing on the wing of her F22 fighter is **8000 Pa** and each foot has an area of **0.03 m^2**?

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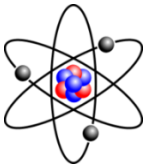

5. What is the area of each car tire for a car with a weight of **9600 N** and the pressure on one tire is is **980 Pa**? (Remember, there are four tires.)

6. Calculate the pressure **IN POUNDS** per square meter for an elevator floor with an area of **6 m^2**. 20 Colonial Christian Students who together weigh **15,000 N** are standing on it.

What is the average weight of the students.

7. Colonial lab tables measure **3.21 m by 1.57 m**. They exert a pressure of **264.9 N/m^2**. How much do they weigh in pounds?

8. Underwater welding expert, Wilson, has a column of water above him the weighs **12,000 N**, as he puts the final touches on an oil platform. How much pressure will be exerted on his body which has an area of **2 m^2**?

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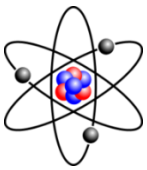

Hydraulics

$F/A = F/A$

$A_{circle} = \pi r^2$

9. A **hydraulic** press has an input cylinder 1 inch in diameter and an output cylinder 6 inches in diameter.
   a. Assuming 100% efficiency, find the force exerted by the output piston when a force of 10 pounds is applied to the input piston.

   b. If the input piston is moved through 4 inches, how far is the output piston moved?

10. A hydraulic system is said to have a mechanical advantage of 40. If the input piston, with a 12 inch radius, has a force of 65 pounds pushing downward and moves a distance of 20 inches,
   a. Find the volume of fluid that has been displaced.

   b. Find the upward force on the output piston.

   c. Find the radius of the output piston.

   d. Find the distance the output piston moves.