

5.5.1 Pressure

Pressure is the force per unit area:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$



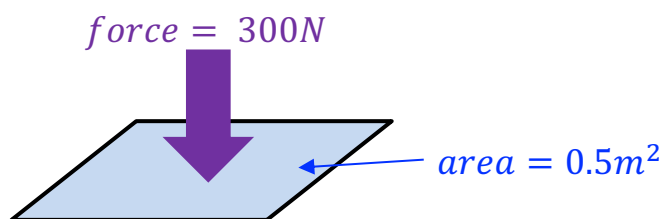
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(1) *If force is measured in newtons (N) and area is measured in metres squared (m^2), what is the unit for pressure?*

(2) *If force is measured in newtons (N) and area is measured in centimetres squared (cm^2), what is the unit for pressure?*

The unit N/m^2 is also known as the *pascal* (Pa).

Consider the following. A force of 300N is acting over an area of 0.5m^2 .



(3) *Calculate the pressure in the situation above. (Hint: Use the equation for pressure (top). Remember to include the unit.)*

(4) *What would happen to the pressure, if the force was doubled? (Hint: Use 600N in your calculation instead of 300N.)*

(5) *What would happen to pressure, if the area was doubled? (Hint: Use 1m^2 instead of 0.5m^2 .)*

(6) *Complete the following:*

The bigger the force, the _____ the pressure. The bigger the area, the _____ the pressure.

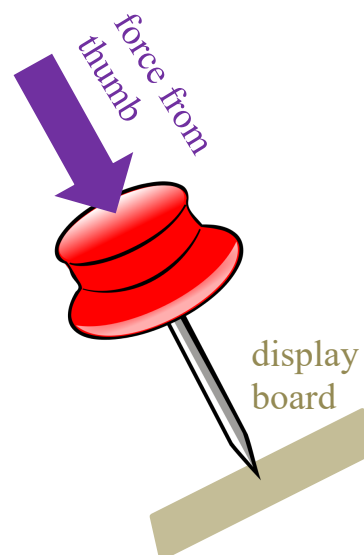


People wear snowshoes for walking soft snow. The snowshoe has a large surface area. This means that the downward force (weight) of the person is spread over a large area, which reduces the pressure on the snow and stops the person sinking in.

A drawing pin has a large flat top for pushing with your thumb and a sharp end to sink into a display board.

(7) *When a force is applied to the drawing pin (from the thumb) which end will experience the greatest force?*

(8) *Which end will experience the greatest pressure? Why?*



(9) *How could you modify the design of the drawing pin so that it is more comfortable to press into a display board?*

(10) *Rearrange the equation for pressure to make force the subject (i.e. force = ...).*

(11) *The drawing pin head has an area of 0.5cm^2 . The pressure under the thumb (when pushing) is 500N/cm^2 . What force is being applied? (Hint: Use your rearranged equation from question (9).)*

(12) *Rearrange the equation for pressure to make area the subject (i.e. area = ...).*

(13) *When the thumb is pushing with a force of 250N , the pressure at the pointy end of the drawing pin is 100000N/cm^2 . What is the area of the drawing pin point?*