



- 1 Pressure = force $\div$ area.

A force of 600 N acts on an area of 2.5 m^2 .

Work out the pressure in N/m^2 .

(2 marks)

$$P = F \div A$$

$$P = 600 \div 2.5$$

$$\boxed{240 \text{ N/m}^2}$$

- 2 A crate rests on horizontal ground on a square base of side 0.5 m.

The crate exerts a force of 180 N on the ground.

Work out the pressure on the ground.

Give your answer in N/m^2 .

(3 marks)

$$\text{Area of the base} = 0.5 \times 0.5 = 0.25 \text{ m}^2$$

$$\text{Use pressure} = \text{force} \div \text{area}$$

$$\text{Pressure} = 180 \div 0.25 = 720 \text{ N/m}^2$$

$$\boxed{720 \text{ N/m}^2}$$

- 3 The pressure on a floor is 45 N/m^2 . The area in contact with the floor is 0.8 m^2 .

Work out the force.

(2 marks)

$$P = F \div A \text{ so } F = P \times A$$

$$F = 45 \times 0.8$$

$$\boxed{36 \text{ N}}$$

- 4 A machine exerts a force of 1200 N on the ground. The pressure is 300 N/m^2 .

Work out the area of ground in contact with the machine.

(2 marks)

$$P = F \div A \text{ so } A = F \div P$$

$$A = 1200 \div 300$$

$$\boxed{4 \text{ m}^2}$$

- 5 A force of 150 N acts on a circular base of radius 5 cm.
Work out the pressure in N/cm^2 . Give your answer correct to 2 decimal places.

(3 marks)

$$A = \pi \times 5^2$$

$$A = 78.539... \text{ cm}^2$$

$$p = 150 \div 78.539...$$

$$p = 1.9098...$$

$$\boxed{1.91 \text{ N/cm}^2}$$

- 6 $1 \text{ m}^2 = 10\,000 \text{ cm}^2$.
a. Change a pressure of 2400 N/m^2 to N/cm^2 .
b. Change a pressure of 0.5 N/cm^2 to N/m^2 .

(2 marks)

a)

$$1 \text{ m}^2 = 10\,000 \text{ cm}^2$$

$$2400 \div 10\,000 = 0.24$$

$$\boxed{0.24 \text{ N/cm}^2}$$

b)

$$0.5 \times 10\,000 = 5000$$

$$\boxed{5000 \text{ N/m}^2}$$

- 7 A solid cube of side 20 cm exerts a force of 160 N on a table. The cube rests on one face.
Work out the pressure on the table in N/m^2 .

(3 marks)

Change to metres: $20 \text{ cm} = 0.2 \text{ m}$

$$A = 0.2 \times 0.2 = 0.04 \text{ m}^2$$

$$p = 160 \div 0.04$$

$$\boxed{4000 \text{ N/m}^2}$$

- 8 A cuboid block has a volume of 0.06 m^3 and a height of 0.3 m. It rests on its base on horizontal ground and exerts a force of 900 N.
Work out the pressure on the ground in N/m^2 .

(4 marks)

$$V = \text{area} \times \text{height}$$

$$\text{area} = 0.06 \div 0.3 = 0.2 \text{ m}^2$$

$$p = 900 \div 0.2$$

$$\boxed{4500 \text{ N/m}^2}$$

- 9 A concrete slab is a cuboid of width 0.8 m and thickness 0.1 m. It lies flat on the ground and exerts a force of 1440 N. The pressure on the ground is 600 N/m^2 .
Work out the length of the slab.

(4 marks)

$$A = F \div p = 1440 \div 600 = 2.4 \text{ m}^2$$

Thickness not needed: it lies flat

$$\text{length} \times 0.8 = 2.4$$

$$\text{length} = 2.4 \div 0.8$$

$$\boxed{3 \text{ m}}$$

- 10 A force of 600 N acts on an area of 0.5 m^2 . Amy says "If the area is increased by 25%, the pressure will decrease by 25%."
Is Amy correct? You must show your working.

(4 marks)

$$p = 600 \div 0.5 = 1200$$

$$\text{new area} = 0.5 \times 1.25 = 0.625$$

$$\text{new } p = 600 \div 0.625 = 960$$

$$\text{fall} = 1200 - 960 = 240$$

$$240 \div 1200 = 0.2 = 20\%$$

$\boxed{\text{No: it falls by } 20\%}$

- 11 A metal box rests on horizontal ground on a rectangular base.
The box exerts a force of 480 N on the ground.
The pressure on the ground is 60 N/m^2 .
The width of the base is 2.5 m.
Work out the length of the base.

(3 marks)

Rearrange pressure = force $\div$ area to give area = force $\div$ pressure

$$\text{Area} = 480 \div 60 = 8 \text{ m}^2$$

$$\text{Length} = 8 \div 2.5 = 3.2 \text{ m}$$

$$\boxed{3.2 \text{ m}}$$