

Pressure, Force and Area

For AQA GCSE Mathematics (8300) • Foundation tier

Name _____

Total marks: **25**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator.

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

A square paving slab lies flat on sand.

The area of the slab is 0.25 m^2

The pressure of the slab on the sand is 600 N/m^2

What force does the slab exert on the sand?

Circle your answer.

[1 mark]

150 N

599.75 N

600.25 N

2400 N

- 2** A box exerts a force of 240 N on an area of 0.8 m^2
Work out the pressure.

[2 marks]

Answer _____ N/m^2

- 3 The pressure on an area of 12 cm^2 is 50 N/cm^2
Work out the force.

[2 marks]

Answer _____ N

- 4 A force of 350 N produces a pressure of 14 N/cm^2
Work out the area.

[2 marks]

Answer _____ cm^2

- 5
$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Mia pushes a drawing pin into a cork board with a force of 24 newtons .
The point of the pin has an area of $0.4 \text{ square millimetres}$.
Work out the pressure under the point of the pin.
Give the units of your answer.

[2 marks]

Answer _____

- 6 The force is doubled and the area is halved.
What happens to the pressure?
Circle your answer.

[1 mark]

$\div 4$

$\div 2$

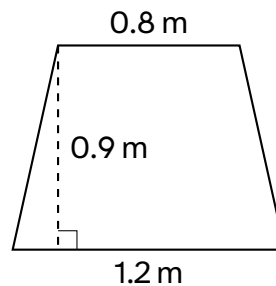
no change

$\times 2$

$\times 4$

- 7 A statue stands on a flat base.
The base is a trapezium.
The statue exerts a force of 2700 newtons (N) on the ground.

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



Not drawn accurately

Work out the pressure of the statue on the ground.

[3 marks]

Answer _____ N/m^2

- 8** A solid cuboid measures 2 m by 1.5 m by 0.5 m.
It exerts a force of 900 N on the floor.
- The cuboid can rest on the floor on any of its faces.
Work out the greatest possible pressure on the floor.

[3 marks]

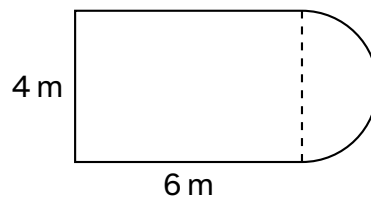
Answer _____ N/m²

- 9** Standing on all four feet, an elephant exerts a pressure of 12.5 tonnes per square metre on the ground.
Work out this pressure in kilograms per square centimetre.
Use
- 1 tonne = 1000 kilograms
 - 1 metre = 100 centimetres

[3 marks]

Answer _____ kg/cm²

- 10** A school has a stage.
The shape of the stage is a rectangle joined to a semicircle.



Not drawn accurately

- (a) The stage exerts a force of 15 000 newtons (N) on the ground.

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

Assume that the whole base of the stage touches the ground.

Work out the pressure of the stage on the ground.

Give your answer to 3 significant figures.

[4 marks]

Answer _____ N/m²

- (b) In fact, the stage stands on eight legs.
Only the ends of the legs touch the ground.
How does this affect the pressure on the ground compared with your answer to part (a)?
Tick one box.
Give a reason for your answer.

[2 marks]

☐

it is greater

☐

it is the same

☐

it is less
