

Pressure, Force and Area

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

Name _____

Total marks: **24**

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

- 1** A wardrobe stands on four legs on a floor.
The wardrobe exerts a force of 900 newtons on the floor.
The pressure on the floor under the legs is 22 500 newtons/m²

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

Work out the total area of the four legs in contact with the floor.

..... m²
(2)

(Total for Question 1 is 2 marks)

- 2** A pressure of 45 newtons/m² acts on an area of 1.6 m² of ground.

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

Work out the force on the ground.

..... newtons
(2)

(Total for Question 2 is 2 marks)

- 3** A fridge stands on a kitchen floor.
The base of the fridge is a rectangle 60 cm by 55 cm.
The fridge exerts a force of 660 newtons on the floor.

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

Work out the pressure on the floor due to the fridge.

..... newtons/cm²
(2)

(Total for Question 3 is 2 marks)

- 4** A water butt in the shape of a cylinder stands on horizontal ground.
The base of the water butt is a circle of radius 30 cm.
When it is full of water, the water butt exerts a force of 1500 newtons on the ground.

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

Work out the pressure on the ground due to the water butt.
Give your answer correct to 2 decimal places.

..... newtons/cm²
(3)

(Total for Question 4 is 3 marks)

- 5** A box in the shape of a cuboid measures 40 cm by 25 cm by 10 cm.
The box exerts a force of 200 newtons on a floor.

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

The box can rest on the floor on any of its faces.

Work out the greatest possible pressure the box can exert on the floor.

..... newtons/cm²
(3)

(Total for Question 5 is 3 marks)

- 6** A concrete block is a prism.
The block stands on its cross-section on horizontal ground.
The volume of the block is 0.9 m³
The block exerts a force of 21 600 newtons on the ground.
The pressure on the ground due to the block is 7200 newtons/m²

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

Work out the height of the block.

..... m
(3)

(Total for Question 6 is 3 marks)

- 7** A crate stands on a horizontal floor.
 The base of the crate is a square.
 The crate exerts a force of 810 newtons on the floor.
 The pressure on the floor due to the crate is 1000 newtons/m²

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

Work out the length of one side of the base.

..... m
 (3)

(Total for Question 7 is 3 marks)

- 8** A solid steel cube rests on a horizontal bench.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$
 The cube exerts a force of 600 newtons on the bench.
 The pressure on the bench due to the cube is 1.5 newtons/cm²
 Work out the volume of the cube.

..... cm³
 (3)

(Total for Question 8 is 3 marks)

- 9 A loaded sledge is on flat snow.
The sledge exerts a force of 900 newtons on the snow.
The area of the runners in contact with the snow is 0.15 m^2

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

Some bags are taken off the sledge, so the force decreases by 20%.
Wider runners are fitted, so the area in contact with the snow is now 0.2 m^2

Work out the percentage decrease in the pressure on the snow.
You must show your working.

..... %
(3)

(Total for Question 9 is 3 marks)
