

PRESSURE, FORCE AND AREA - PRACTICE QUESTIONS
CALCULATOR ALLOWED



metatutor

1.

Find the pressure exerted by a force of 600 Newtons on an area of 30 m^2 .

Give your answer in N/m^2 .

$$P = \frac{F}{A} \quad 600 \div 30 = \underline{20 \text{ N/m}^2}$$

2.

An object is placed on a floor.

The area of the object in contact with the floor is 3 m^2 .

The pressure exerted by the object is 15 N/m^2 .

Find the force exerted by the object on the floor, in Newtons.

$$3 \times 15 = \underline{45 \text{ N}}$$

3.

A box exerts a force of 240 Newtons on a table.

The pressure exerted on the table is 80 N/m^2 .

Find the area of the box in contact with the table, in m^2 .

$$\frac{240}{80} = \underline{3 \text{ m}^2}$$

4.

Find the pressure exerted by a force of 72 Newtons on an area of 6 m^2 .

Give your answer in N/m^2 .

$$72 \div 6 = \underline{12 \text{ N/m}^2}$$

5.

An object exerts a force of 800 Newtons on a floor.
The pressure exerted on the floor is 160 N/m^2 .

Find the area of the object in contact with the floor, in m^2 .

$$800 \div 160 = \underline{5 \text{ m}^2}$$

6.

An object is placed on a table.
The area of the object in contact with the table is 1.8 m^2 .
The pressure exerted by the object is 60 N/m^2 .

Find the force exerted by the object on the table, in Newtons.

$$1.8 \times 60 = \underline{108 \text{ N}}$$

7.

A crate is placed on a pallet.
The crate exerts a force of 1,200 Newtons on the pallet.
The area of the crate in contact with the pallet is 16 m^2 .

Find the pressure exerted by the crate on the pallet, in N/m^2 .

$$1,200 \div 16 = \underline{75 \text{ N/m}^2}$$

8.

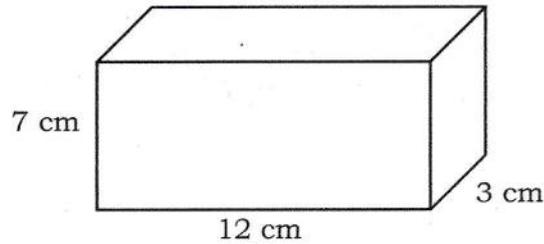
A dumbbell is placed on a floor.
The area of the dumbbell in contact with the floor is 0.4 m^2 .
The pressure exerted by the safe is 190 N/m^2 .

Find the force exerted by the dumbbell on the floor, in Newtons.

$$0.4 \times 190 = \underline{76 \text{ N}}$$

9.

Pictured below is a box.



The force exerted by the box on the floor is 9 Newtons.

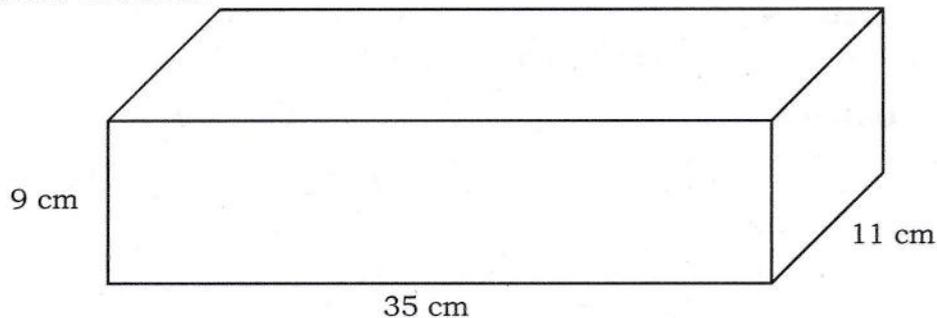
Find the pressure exerted by the box on the floor, in N/cm^2 .

$$\text{Area} = 3 \times 12 = 36 \text{ cm}^2$$

$$\text{Pressure} = 9 \div 36 = \underline{0.25 \text{ N}/\text{cm}^2}$$

10.

Pictured below is a box.



The pressure exerted by the box on the floor is $1.2 \text{ N}/\text{cm}^2$.

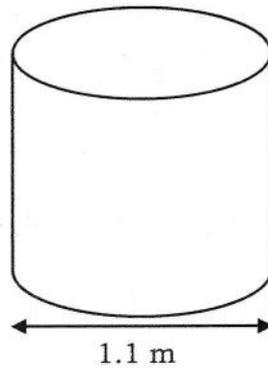
Find the force exerted by the box on the floor, in Newtons.

$$\text{Area} = 35 \times 11 = 385 \text{ cm}^2$$

$$\text{Force} = 1.2 \times 385 = \underline{462 \text{ N}}$$

11.

Pictured below is a cylinder.



The pressure exerted by the cylinder on the floor is 17.5 N/m^2 .

Find the force exerted by the cylinder on the floor, in Newtons.

Give your answer to 2 significant figures.

$$\text{Radius} = 1.1 \div 2 = 0.55 \text{ m}$$

$$\text{Area} = 0.55^2 \times \pi = 0.9503 \dots \text{ m}^2$$

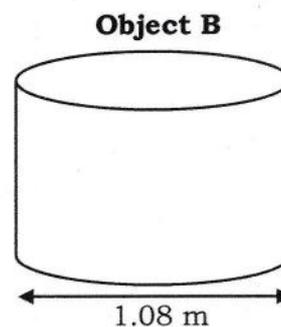
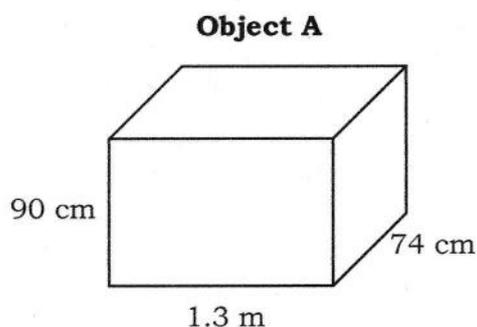
$$\text{Force} = 0.9503 \dots \times 17.5$$

$$= 16.6308 \dots$$

$$= \underline{17 \text{ N}}$$

12.

Pictured below are two objects – Object A and Object B.



The force exerted by Object A on the floor is 1,980 Newtons.

The force exerted by Object B on the floor is 1,850 Newtons.

Which object exerts the largest pressure on the floor – Object A or Object B?

$$A: \text{Area} = 130 \times 74 = 9,620 \text{ cm}^2$$

$$\text{Pressure} = 1,980 \div 9,620 = 0.205821 \text{ N/cm}^2$$

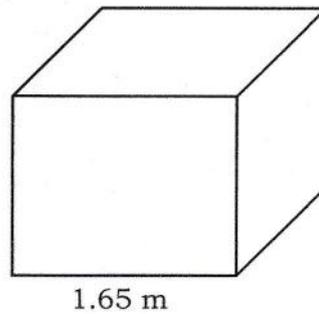
$$B: \text{Area} = 54^2 \times \pi = 9,160.88 \dots \text{ cm}^2$$

$$\text{Pressure} = 1,850 \div 9,160.88 \dots = 0.20194 \dots \text{ N/cm}^2$$

Object A exerts the largest pressure.

13.

Pictured below is a cube.



The cube exerts a pressure of 0.033 N/cm^2 on the ground.

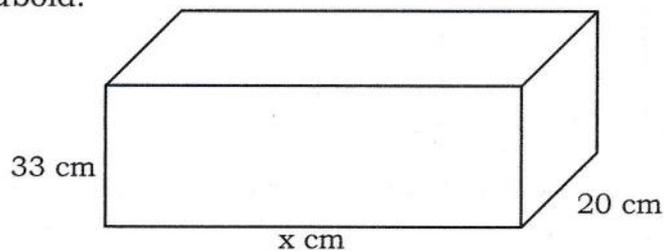
Find the force exerted by the cube on the ground, in Newtons.
Give your answer to 3 significant figures.

$$\text{Area} = 165 \times 165 = 27,225 \text{ cm}^2$$

$$\begin{aligned} \text{force} &= 27,225 \times 0.033 \\ &= 898.425 \\ &= \underline{898 \text{ N}} \end{aligned}$$

14.

Pictured below is a cuboid.



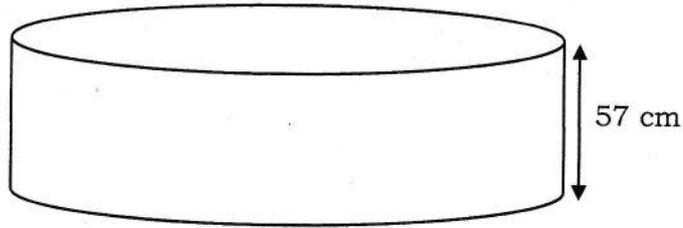
The cuboid exerts a pressure of 1.2 N/cm^2 and a force of 1,550 Newtons on the ground.

Find x , to 2 significant figures.

$$\begin{aligned} \text{Area} &= 1,550 \div 1.2 \\ &= 1,291.6 \text{ cm}^2 \\ x &= 1,291.6 \div 20 \\ &= 64.583 \\ &= \underline{65 \text{ cm}} \end{aligned}$$

15.

Pictured below is a cylinder.



The cylinder exerts a pressure of 98 N/m^2 and a force of 2,535 Newtons on the ground.

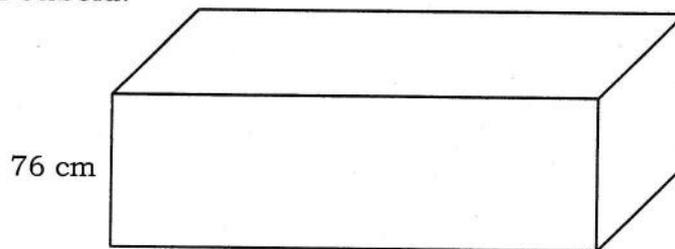
Find the volume of the cylinder, giving your answer in m^3 to 2 significant figures.

$$\text{Area} = 2,535 \div 98 = 25.867... \text{ m}^2$$

$$\begin{aligned} \text{Volume} &= 25.867... \times 0.57 \\ &= 14.7443... \text{ m}^3 \\ &= \underline{15 \text{ m}^3} \end{aligned}$$

16.

Pictured below is a cuboid.



The cuboid exerts a pressure of 0.88 kiloPascals (kPa) and a force of 4,500 Newtons on the ground.

$$1 \text{ kPa} = 1,000 \text{ N/m}^2$$

Find the volume of the cuboid, giving your answer in m^3 to 3 significant figures.

$$0.88 \text{ kPa} = 0.88 \times 1000 = 880 \text{ N/m}^2$$

$$\text{Area} = 4500 \div 880 = 5.1136 \text{ m}^2$$

$$\begin{aligned} \text{Volume} &= 5.1136 \times 0.76 \\ &= 3.8863 \\ &= \underline{3.89 \text{ m}^3} \end{aligned}$$