R25...Compound Measures - Pressure

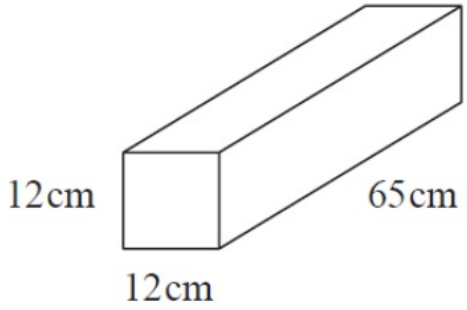
OCR

Edexcel

Video created by W Neill

25 The diagram shows a concrete block on horizontal ground.

R25



$$p = \frac{F}{A}$$

p = pressure
F = force
A = area

The block is a cuboid, 12 cm by 12 cm by 65 cm.
The block exerts a force of 220 newtons on the ground.

Calculate the pressure that the block exerts on the ground.

Give your answer in newtons / cm^2

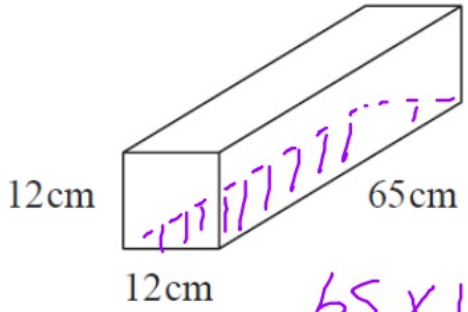
..... newtons / cm^2

(Total for Question 25 is 2 marks)

Video created by W Neill

25 The diagram shows a concrete block on horizontal ground.

R25



65 x 12
= 780 cm²

$$p = \frac{F}{A}$$

p = pressure
F = force
A = area

The block is a cuboid, 12 cm by 12 cm by 65 cm.
The block exerts a force of 220 newtons on the ground.

Calculate the pressure that the block exerts on the ground.

Give your answer in newtons / cm²

$$P = \frac{220}{780\text{cm}^2}$$

0.282 newtons / cm²

(Total for Question .. is 2 marks)

Video created by W Neill

25 A force of 70 newtons acts on an area of 20 cm^2

R25 The force is increased by 10 newtons.
The area is increased by 10 cm^2

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

Helen says,

"The pressure decreases by less than 20%"

Is Helen correct?
You must show how you get your answer.

(Total for Question 25 is 3 marks)

Video created by W Neill

A force of 70 newtons acts on an area of 20 cm^2

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

R25 The force is increased by 10 newtons.
The area is increased by 10 cm^2

Helen says,

"The pressure decreases by less than 20%"

Is Helen correct?
You must show how you get your answer.

Helen is wrong

it decreases by 23.8%.

Now

$$\text{Pressure} = \frac{70}{20}$$

$$= 3.5 \text{ n/cm}^2$$

Then

$$\text{Pressure} = \frac{80}{30}$$

$$= 2.\dot{6} \text{ n/cm}^2$$

$$\%\text{ change} = \frac{\text{Diff}}{\text{original}} \quad \frac{0.8\dot{3}}{3.5} = 23.8\%$$

(Total for Question is 3 marks)

AQA

Video created by W Neill

25

R25

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

Work out the **force** when the pressure is 24 N/m^2 and the area is 3 m^2
Circle your answer.

[1 mark]

0.125 N 8 N 27 N 72 N

Video created by W Neill

25

R25

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

$24 = \frac{?}{3}$

24×3

$= 72$

Work out the **force** when the pressure is 24 N/m^2 and the area is 3 m^2

Circle your answer.

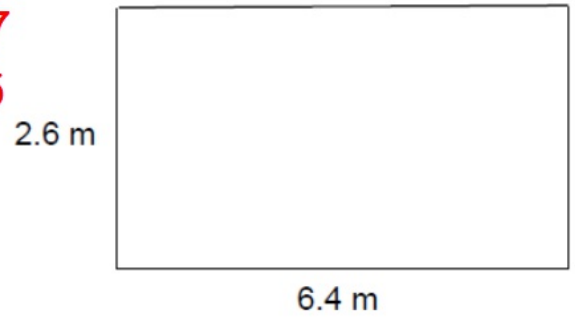
[1 mark]

0.125 N 8 N 27 N 72 N

Video created by W Neill

25 The dimensions of a rectangular floor are to the nearest 0.1 metres.

N57
R25



Not drawn accurately

A force of 345 Newtons is applied to the floor.

The force is to the nearest 5 Newtons.

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

Work out the upper bound of the pressure.

Give your answer to 4 significant figures.

You **must** show your working.

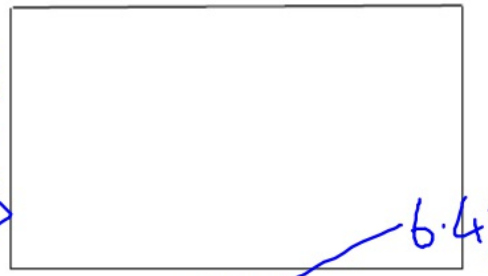
[5 marks]

Answer _____ N/m^2

Video created by W Neill

25 The dimensions of a rectangular floor are to the nearest 0.1 metres.

N57
R25 2.65



Not drawn accurately

2.55
6.45
6.35

350
force = 345 N
340

347.5 N
342.5 N

Area = Smallest = 2.55 x 6.35
= 16.1925

A force of 345 Newtons is applied to the floor.

The force is to the nearest 5 Newtons.

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

greatest pressure

$\frac{\text{force}}{\text{Area}}$ $\frac{\text{Big}}{\text{Small}}$

$$\text{Pressure} = \frac{347.5}{16.1925}$$

Work out the upper bound of the pressure.

Give your answer to 4 significant figures.

You **must** show your working.

=

Answer 21.46 ✓ N/m^2

[5 marks]

Video created by W Neill

12

R25

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

A force of 40 Newtons is applied to an area of 3.2 square metres.

Work out the pressure.

Give the units of your answer.

[2 marks]

Answer _____

Video created by W Neill

12

R25

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

A force of 40 Newtons is applied to an area of 3.2 square metres.

Work out the pressure.

Give the units of your answer.

[2 marks]

Pressure = $\frac{40}{3.2}$

Answer 12.5 n/m^2