Name:

Exam Style Questions

Surface Area of a Cylinder

Corbettmαths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings
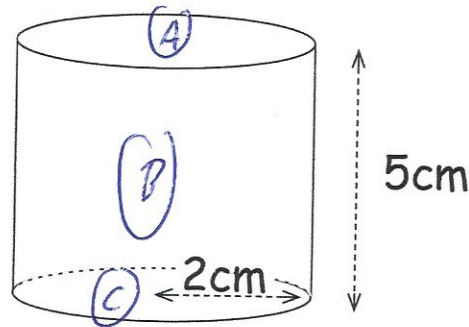
Video Tutorial

www.corbettmaths.com/contents

Video 315

Answers and Video Solutions
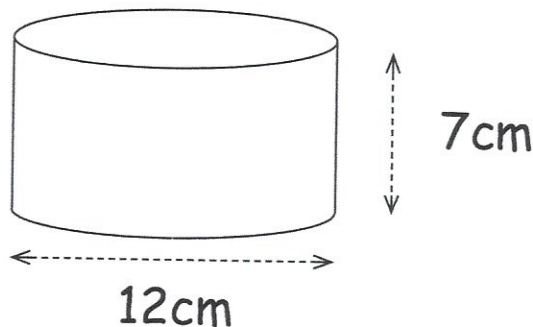
1. Below is a cylinder with radius 2cm and height 5cm.

5cm

2cm

Calculate the surface area of the cylinder.

(A) $\pi \times 2^2 = 12.56637061$ (4π)

(C) $\pi \times 2^2 = 12.56637061$ (4π)

(B) $\pi \times 4 \times 5 = 62.83185307$ (20π)

$+$
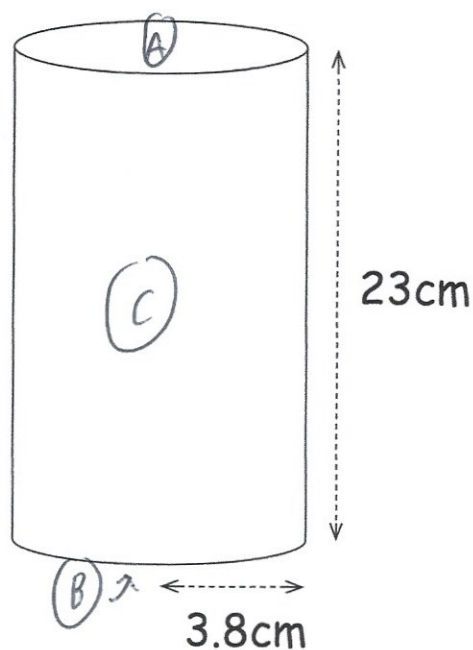
87.9645943

....87.96.... cm²

or 28π (3)

2. Shown below is a cylinder.

7cm

12cm

Calculate the curved surface area.
Give your answer to 1 decimal place.

$\pi \times 12 \times 7 = 263.8937829$ ∴ cm²

(84π)

....263.9.... cm²

(2)

3. A cylindrical container is used to store crisps.
The radius of the container is 3.8cm and the height is 23cm.

23cm

3.8cm

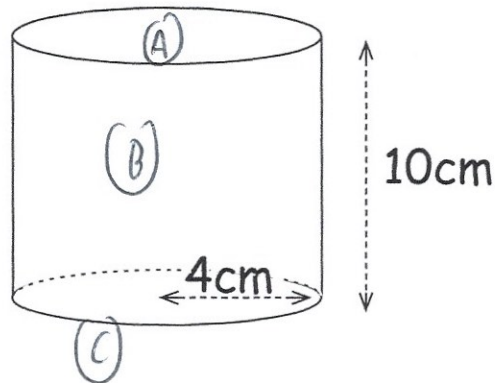Calculate the surface area of the container.

(A) $\pi \times 3.8^2 = 45.36459792$ (14.44π)

(B) $\pi \times 3.8^2 = 45.36459792$ (14.44π)

(C) $\pi \times 7.6 \times 23 = 549.1503958$ (174.8π)

639.8795917 (203.68π)

639.88 ....cm²

(3)

4. Shown below is a cylinder.

Work out the surface area of the cylinder.
Give your answer in terms of π

(A) $\pi \times 4^2 = 16\pi$
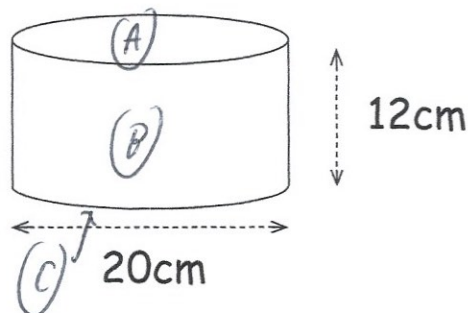
(B) $\pi \times 8 \times 10 = 80\pi$

(C) $\pi \times 4^2 = 16\pi$

$16\pi + 80\pi + 16\pi$

112π ....cm²

(3)

5. Shown below is a cylinder.

Work out the surface area of the cylinder.
Give your answer in terms of π

(A) $\pi \times 10^2 = 100\pi$

(B) $\pi \times 20 \times 12 = 240\pi$

(C) $\pi \times 10^2 = 100\pi$

440π ....cm²

(3)

© Corbettmaths 2022

6. A can of baked beans will have a paper label wrapped around the outside.

11cm

3.5cm

The can has a height of 11cm and a radius of 3.5cm.
The label will cover the entire height of the can.
The label will a 1cm overlap vertically so that it can be stuck together.

Calculate the area of the label.

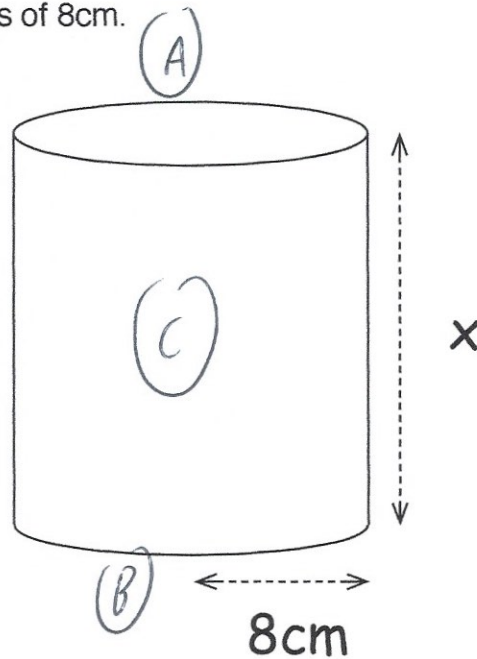$\pi \times 7 = 21.99114858$

$21.99114858 + 1 = 22.99114858$

$22.99114858 \times 11 = 252.90263\ldots$

252.9 ....cm²

(4)

7. A cylinder has a radius of 8cm.

The surface area of the cylinder is 1200cm²

Work out the height of the cylinder, x.

(A) $\pi \times 8^2 = 201.0619298 \, cm^2 \, (64\pi)$

(B) $\pi \times 8^2 = 201.0619298 \, cm^2 \, (64\pi)$

$1200 - (2 \times 201.0619...) = 797.8761403 \, cm^2$
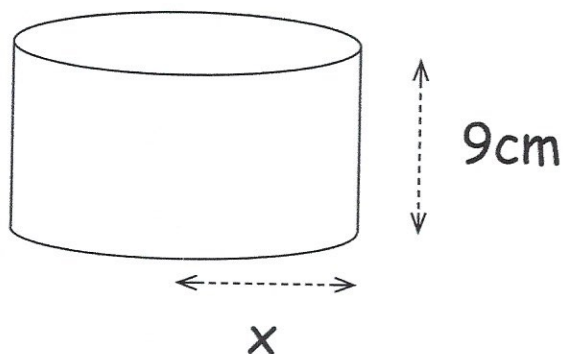
$\pi \times 16 \times x = 797.8761403$

$\div 16\pi \qquad \div 16\pi$

$x = 15.87324...$

15.87 cm

(3)

8. Shown below is a cylinder with a height of 9cm.

9cm

X

The surface area of the cylinder is 180π cm²

Work out the radius of the cylinder, x.

$\pi x^2 + \pi x^2 + \pi(2x) \times 9 = 180\pi$

$2\pi x^2 + 18\pi x = 180\pi$

$2x^2 + 18x = 180$
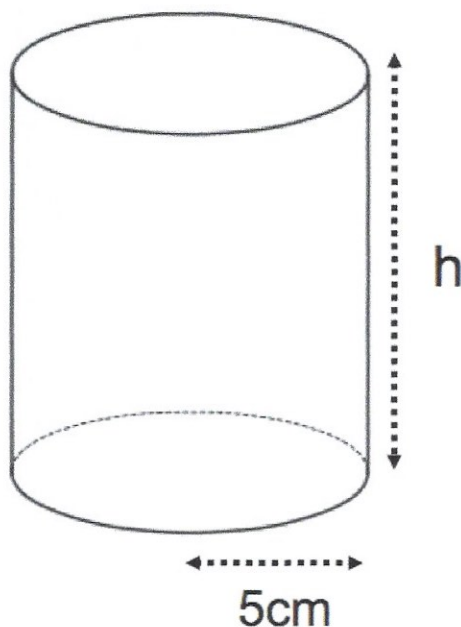
$x^2 + 9x = 90$

$x^2 + 9x - 90 = 0$

$(x+15)(x-6) = 0$

$x = -15$ or $x = 6$ ✓

✗

..........6..........cm

(3)

9.

h

5cm

The surface area of the cylinder is 170π cm².

Calculate the height of the cylinder.

$$\left(\pi \times 5^2\right) + \left(\pi \times 5^2\right) + \left(\pi \times 10 \times h\right) = 170\pi$$

$$25\pi + 25\pi + 10\pi h = 170\pi$$

$$50\pi + 10\pi h = 170\pi$$

$$10\pi h = 120\pi$$

$$10h = 120$$

$$h = 12$$

12

.........................cm

(3)

10. On a farm, there is a grain silo.
The silo is cylindrical with a tile roof.
The silo has a diameter of 8 metres and is 6 metres tall.

The farmer wants to paint the curved surface of the silo.
Each can of paint will cover 20m².
The paint costs £11.75 per can.

How much will it cost the farmer to paint the silo?

$$\pi \times 8 \times 6 = 48\pi \text{ m}^2$$
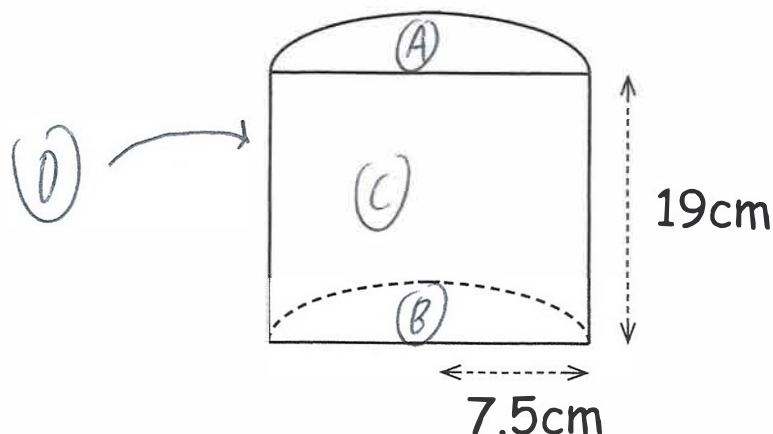$$= 150.7964474 \text{ m}^2$$

$$150.7964... \div 20 = 7.5398...$$

8 cans

$$8 \times 11.75 = £94$$

£ 94

(4)

11. Shown below is a semicylinder.

19cm

7.5cm

Work out the surface area of the semicylinder.

$\text{A} \Rightarrow \frac{1}{2} \times \pi \times 7.5^2 = 88.35729... \text{cm}^2 \ (28.125\pi)$

$\text{B} \Rightarrow \frac{1}{2} \times \pi \times 7.5^2 = 88.35729... \text{cm}^2 \ (28.125\pi)$

$\text{C} \Rightarrow 19 \times 15 = 285 \text{cm}^2$

$\text{D} \Rightarrow \frac{1}{2} \times \pi \times 15 \times 19 = 447.6769531... \text{cm}^2 \ (142.5\pi)$

$\text{A} + \text{B} + \text{C} + \text{D} = 909.3915399 \text{cm}^2$

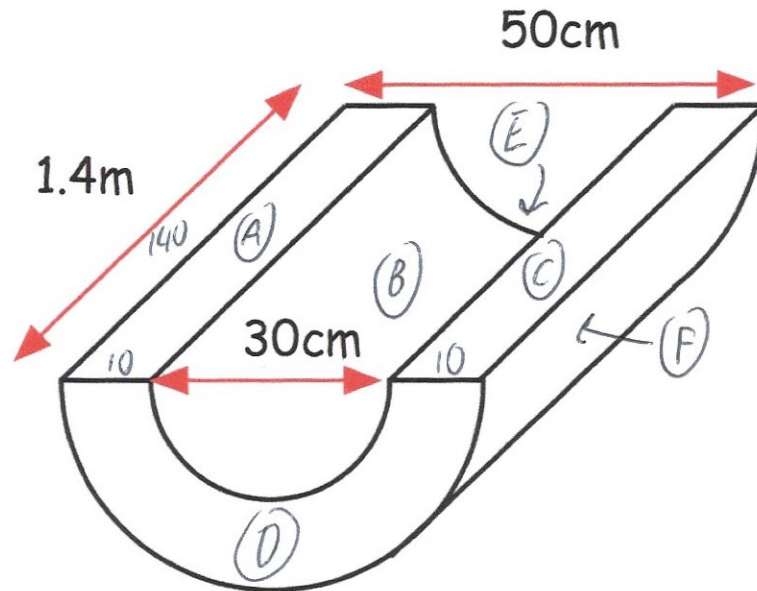............909.4............cm²

(4)

© Corbettmaths 2022

12. Fleur is creating a piece of equipment for a soft play.

She starts with a cylindrical piece of foam, diameter 50cm and length 1.4m
From the centre of the cylinder, Fleur removes a cylinder with diameter 30cm.
Finally she removes the top half of the foam.

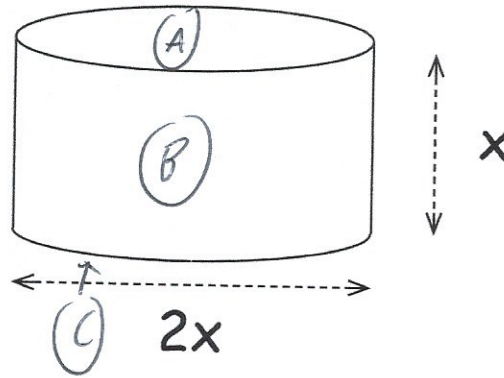The diagram below shows the piece of equipment.

Work out the surface area of the piece of equipment.

(A) $140 \times 10 = 1400 \, cm^2$

(C) $140 \times 10 = 1400 \, cm^2$

(B) $\frac{1}{2} \times \pi \times 30 \times 140 = 2100\pi \, cm^2$

(F) $\frac{1}{2} \times \pi \times 50 \times 140 = 3500\pi \, cm^2$

(D) $\frac{1}{2}\left(\pi \times 25^2 - \pi \times 15^2\right) = 200\pi \, cm^2$

(E) $200\pi \, cm^2$

$1400 + 1400 + 2100\pi + 3500\pi + 200\pi + 200\pi$

$2800 + 6000\pi \, cm^2$

.......21649.56.......cm²

(5)

© Corbettmaths 2022

13.

The cylinder above has surface area 400π cm²

Calculate x.

(A) πx^2

(C) πx^2

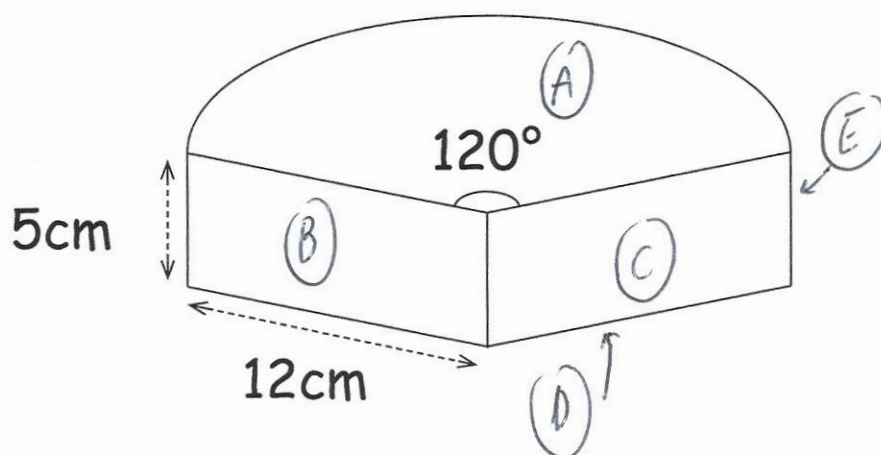(B) $\pi \times 2x \times x = 2\pi x^2$

$4\pi x^2 = 400\pi$

$\pi x^2 = 100\pi$

$x^2 = 100$

$x = 10$

.... 10 ....cm

(4)

14. A mobile pizza van sells slices of pizza.
The box they use is shown below.

The box has a height of 5cm.
The cross-section of the box is a sector, radius 12cm and angle 120°

Find the surface area of the box.

(A) $\frac{1}{3} \times \pi \times 12^2 = 48\pi \ cm^2$

(B) $5 \times 12 = 60 \ cm^2$

(C) $5 \times 12 = 60 \ cm^2$

(D) $48\pi \ cm^2$

(E) $\frac{1}{3} \times \pi \times 24 \times 5 = 40\pi \ cm^2$

$48\pi + 60 + 60 + 48\pi + 40\pi = 547.2566... \ cm^2$

547.26 ....cm²

(6)