18. Tuesday 16th June: Surface area of triangular prisms and cylinders

8X1 – Summer Term 2

Today's lesson is about calculating the surface area of rectilinear shapes. I have split the lesson into two parts:

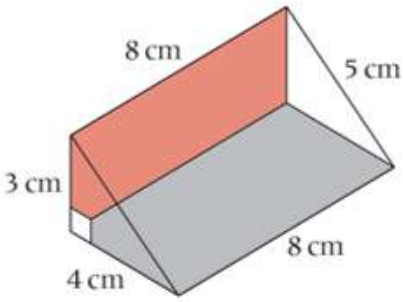
- Part 1: Surface area of triangular prisms
- Part 2: Surface area of cylinders
- Homework: 1 task on mathswatch

Answers are at the end of the document.

Part 1 – Surface area of triangular prisms

Surface area of a triangular prism:
https://corbettmaths.com/2018/01/29/surface-area-of-other-prisms/

EG 1: Find the surface area of a triangular prism



$$\textbf{Front Triangle} - Area = \frac{1}{2}bh$$
$$-Area = \frac{1}{2} \times 4 \times 3$$
$$-Area = \mathbf{6cm^2}$$

$$\textbf{Back Triangle} - Area = \frac{1}{2}bh$$
$$-Area = \frac{1}{2} \times 4 \times 3$$
$$-Area = \mathbf{6cm^2}$$

$$\textbf{Base Rectangle} - Area = bh$$
$$-Area = 4 \times 8$$
$$-Area = \mathbf{32cm^2}$$

$$\textbf{Side Rectangle} - Area = bh$$
$$-Area = 3 \times 8$$
$$-Area = \mathbf{24cm^2}$$

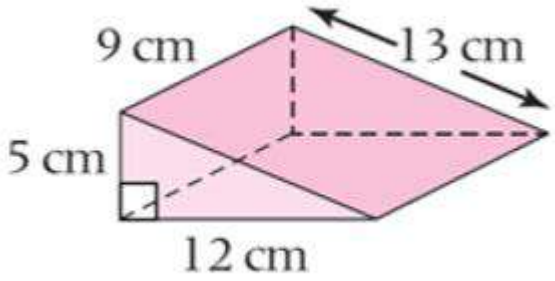
$$\textbf{Slanted Rectangle} - Area = bh$$
$$-Area = 5 \times 8$$
$$-Area = \mathbf{40cm^2}$$

$$\textbf{Total Surface Area} = 6cm^2+6cm^2+32cm^2+24cm^2+40cm^2=108cm^2$$

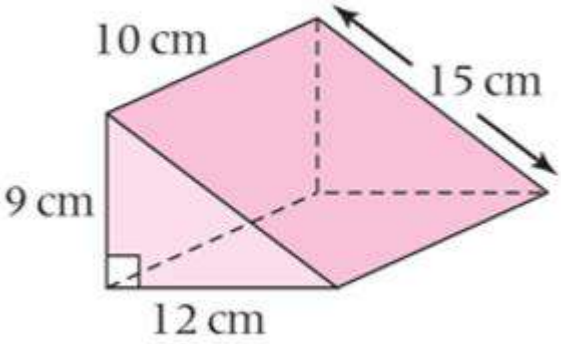
Questions

Find the surface area of each of the following trianglular prisms

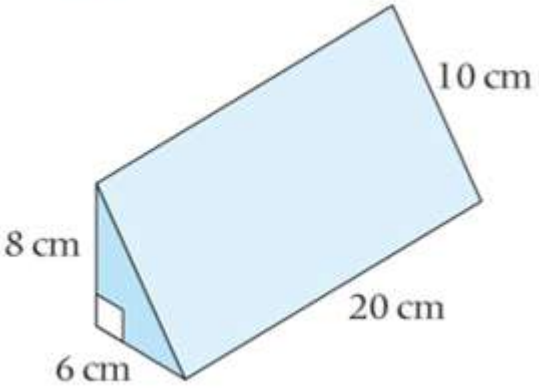
Question 1



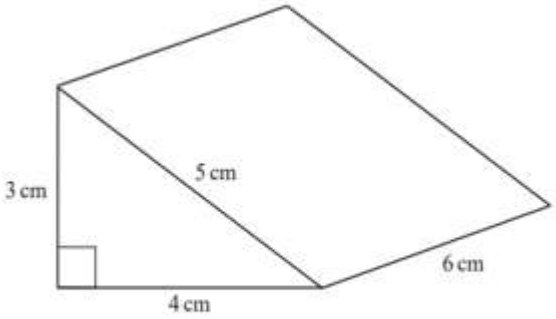
Question 2



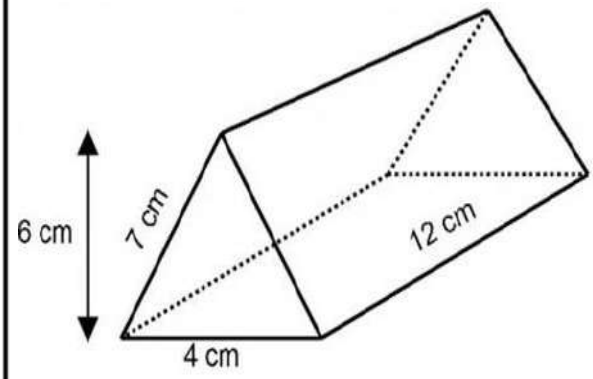
Question 3



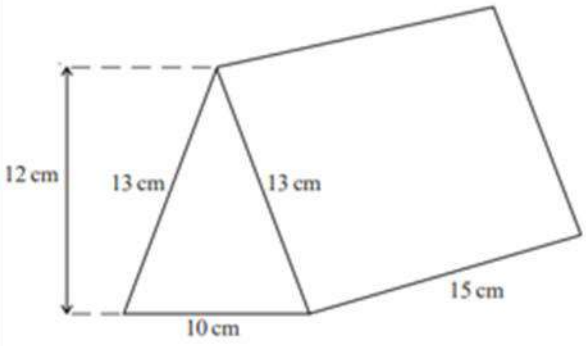
Question 4



Question 5



Question 6

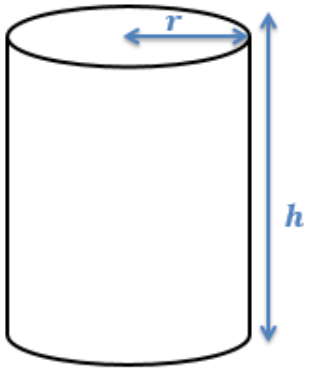


Part 2 – Surface area of cylinders

Two videos to watch to help understanding:

Surface area of cylinders:
https://corbettmaths.com/2013/04/04/surface-area-of-a-cylinder/

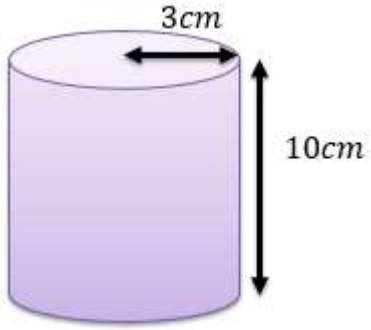
Surface Area of Cylinders



By making a vertical slit and folding out the curved surface of the cylinder so that it is rectangular:

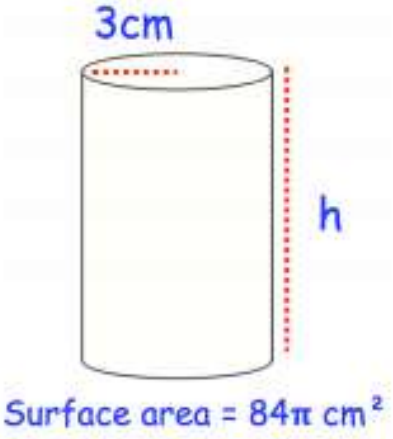
$$Curved\ Surface\ Area = 2\pi rh$$
$$Total\ Surface\ Area = 2\pi r^2 + 2\pi rh$$

EG 2: Find the surface area of the cylinder

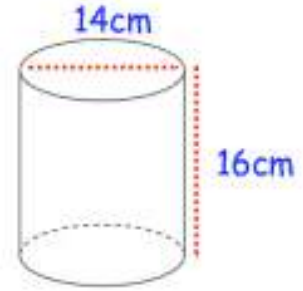
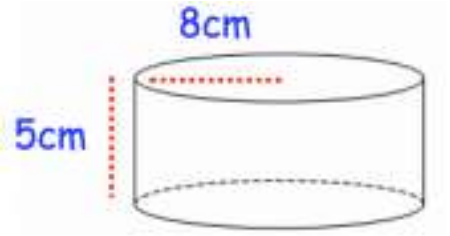
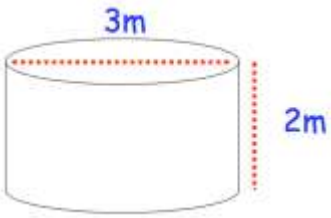
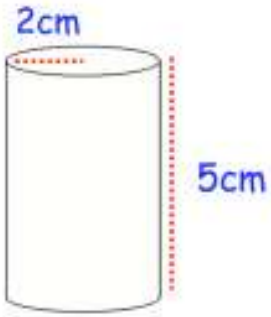
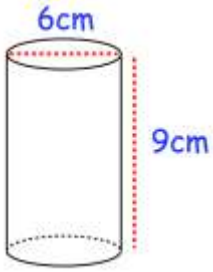
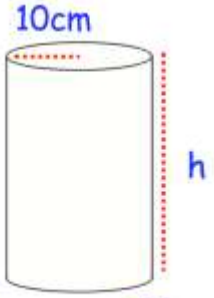
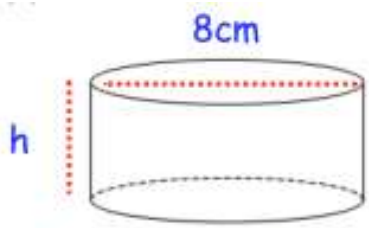
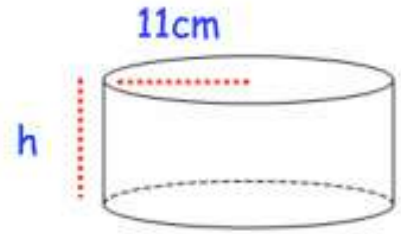


Surface Area
Area of top: $\boldsymbol{\pi \times 3^2 = 9\pi}$
Area of base: $\boldsymbol{9\pi}$
Area of curved surface area: **circumference of the circle × height:** $\boldsymbol{6 \times \pi \times 10 = 60\pi}$
Total = $\boldsymbol{60\pi + 9\,\pi + 9\pi = 78\pi}$

EG 3: Working backwards, given the surface area



$$\pi \times 3^2 + \pi \times 3^2 + (2 \times 3 \times \pi \times h) = 84\pi$$
$$18\pi + 6\pi h = 84\pi$$
$$6\pi h = 66\pi$$
$$6h = 66$$
$$h = 11$$

Question 1	Question 2
Calculate the surface area to 2dp 	Calculate the surface area to 2dp 
Question 3	**Question 4**
Calculate the surface area to 2dp 	Calculate the surface area in terms of π 
Question 5	**Question 6**
Calculate the surface area in terms of π 	Calculate the height  Surface area = 900π cm^2
Question 7	**Question 8**
Calculate the height  Surface area = 56π cm^2	Calculate the height to 2 dp  Surface area = 850cm^2

Now complete the mathswatch ☺

Answers – Part 1

1) $330cm^2$
2) $456cm^2$
3) $528cm^2$
4) $84cm^2$
5) $240cm^2$
6) $660cm^2$

Part 2

1) $1011.59cm^2$
2) $653.45cm^2$
3) $32.99m^2$
4) $28\pi\ cm^2$
5) $72\pi\ cm^2$
6) 35cm
7) 3cm
8) 1.3cm (1.30cm)