



Warm Up Grade 8

Date: Apr 8

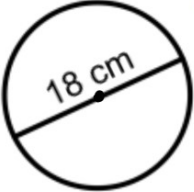
$$A_{\circ} = \pi r^2$$

$$\pi \times r \times r$$

$$A_{\Delta} = \frac{b \times h}{2}$$



1) Find the area for each

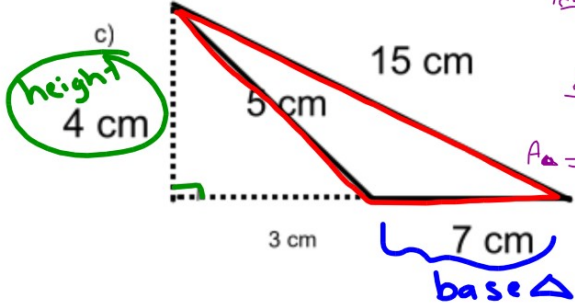
a) 

Given  
 $d = 18 \text{ cm}$   
 $r = 9 \text{ cm}$

$$A_{\circ} = \pi r^2$$

$$= \pi \times 9 \text{ cm} \times 9 \text{ cm}$$

$$= 254.34 \text{ cm}^2$$

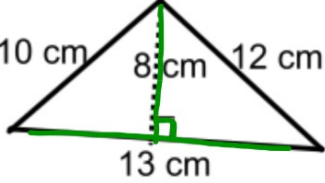
c) 

$$A_{\Delta} = \frac{b \times h}{2}$$

$$\frac{7 \text{ cm} \times 4 \text{ cm}}{2}$$

$$\frac{28 \text{ cm}^2}{2}$$

$$A_{\Delta} = 14 \text{ cm}^2$$

b) 

$$A_{\Delta} = \frac{b \times h}{2}$$

$$= \frac{13 \text{ cm} \times 8 \text{ cm}}{2}$$

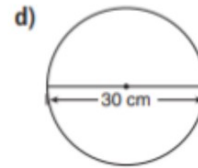
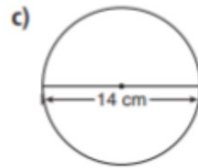
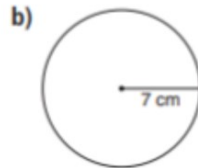
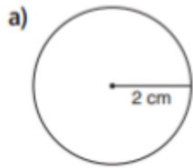
$$= \frac{104 \text{ cm}^2}{2}$$

$$A_{\Delta} = 52 \text{ cm}^2$$

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## Solutions

1. Calculate the area of each circle.

Estimate to check your answers are reasonable.

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$$a) r = 2 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 2 \times 2 \\ &= 12.56 \text{ cm}^2 \\ &\approx 3 \times 2 \times 2 = 12 \end{aligned}$$

$$c) d = 14$$

$$\text{so } r = 7 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 7 \times 7 \\ &= 153.86 \text{ cm}^2 \end{aligned}$$

$$b) r = 7 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 7 \times 7 \\ &= 153.86 \text{ cm}^2 \\ &\approx 3 \times 7 \times 7 \text{ or } 3 \times 50 = 150 \end{aligned}$$

$$d) d = 30 \text{ cm}$$

$$\text{so } r = 15 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 15 \times 15 \\ &= 706.5 \text{ cm}^2 \\ &\approx 3 \times 225 \\ &\quad 675 \end{aligned}$$

$$2. a) r = 3 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 3 \times 3 \\ &= 28.26 \text{ cm}^2 \\ &\approx 3 \times 3 \times 3 = 27 \end{aligned}$$

$$c) r = 9 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 9 \times 9 \\ &= 254.34 \text{ cm}^2 \\ &\approx 3 \times 9 \times 9 = 243 \end{aligned}$$

$$b) d = 12 \text{ cm}$$

$$r = 6 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 6 \times 6 \\ &= 113.04 \text{ cm}^2 \\ &\approx 3 \times 6 \times 6 = 108 \end{aligned}$$

$$d) d = 24 \text{ cm}$$

$$r = 12 \text{ cm}$$

$$\begin{aligned} A &= \pi \times r \times r \\ &= 3.14 \times 12 \times 12 \\ &= 452.16 \text{ cm}^2 \end{aligned}$$

$$\approx 3 \times 12 \times 12$$

$$\approx 3 \times 150$$

$$450$$

3. Use the results of question 2c. What happens to the area in each case?  
 a) You double the radius of a circle.  
 b) You triple the radius of a circle.  
 c) You quadruple the radius of a circle.  
 Justify your answers.

$r = 9\text{cm}$

$A_0 = \pi r^2$   
 $\pi \times r \times r$   
 $\pi \times 3r \times 3r$   
 $9\pi r^2$   
 $9\pi r^2$

original  $r=3$   
 triple  
 $c) r = 9\text{cm}$   
 $A = \pi \times r \times r$   
 $= 3.14 \times 9 \times 9$   
 $= 254.34\text{cm}^2$

3a) Double the radius will cause the area to be 4 times larger.

$r = 9\text{ cm}$	$\times 2$	$r = 18\text{ cm}$
$A = \pi \times r \times r$		$A = \pi \times r \times r$
$= 3.14 \times 9\text{ cm} \times 9\text{cm}$		$= 3.14 \times 18\text{ cm} \times 18\text{cm}$
$= 254.34\text{ cm}^2$		$= 1017.36\text{ cm}^2$

$A_0 = \pi r^2$   
 $\pi \times r \times r$   
 $\pi \times 2r \times 2r$   
 $A = 4\pi r^2$   
 4 times original Area

$1017.36\text{ cm}^2 \div 254.34\text{ cm}^2 = 4$  times larger  
 when you double the radius

3b) Triple the radius will cause the area to be 9 times larger.

$r = 9\text{ cm}$	$\times 3$	$r = 27\text{ cm}$
$A = \pi \times r \times r$		$A = \pi \times r \times r$
$= 3.14 \times 9\text{ cm} \times 9\text{cm}$		$= 3.14 \times 27\text{ cm} \times 27\text{cm}$
$= 254.34\text{ cm}^2$		$= 2289.06\text{ cm}^2$

$2289.06\text{ cm}^2 \div 254.34\text{ cm}^2 = 9$  times larger  
 when you triple the radius

3c) Quadruple the radius will cause the area to be 16 times larger.

$r = 9\text{ cm}$	$\times 4$	$r = 36\text{ cm}$
$A = \pi \times r \times r$		$A = \pi \times r \times r$
$= 3.14 \times 9\text{ cm} \times 9\text{cm}$		$= 3.14 \times 36\text{ cm} \times 36\text{cm}$
$= 254.34\text{ cm}^2$		$= 4069.44\text{ cm}^2$

$4069.44\text{ cm}^2 \div 254.34\text{ cm}^2 = 16$  times larger  
 when you quadruple the radius

$$A_0 = \pi r^2$$
$$\pi \times r \times r$$

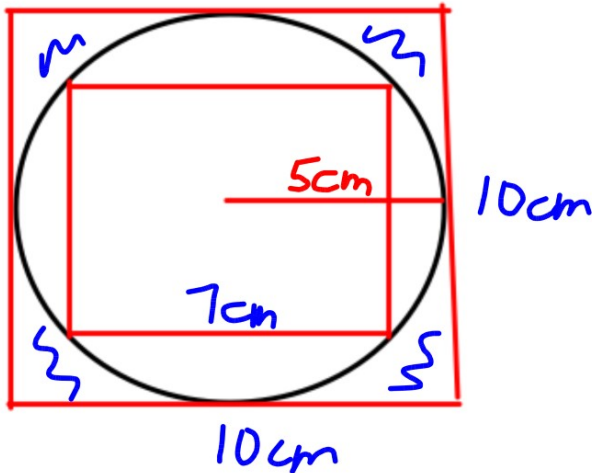
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quad.

$$\pi \underline{4r} \underline{4r}$$
$$16 \pi r^2$$

So if you quadruple radius the Area become  
16 times larger

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4.



$$\begin{aligned} \text{Area of small square} &= 7 \times 7 \\ &= 49 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of Large square} &= 10 \times 10 \\ &= 100 \text{ cm}^2 \end{aligned}$$

So <sup>the</sup> area of <sup>the</sup> circle is between 49 and 100  
 $\approx 75 \text{ cm}^2$

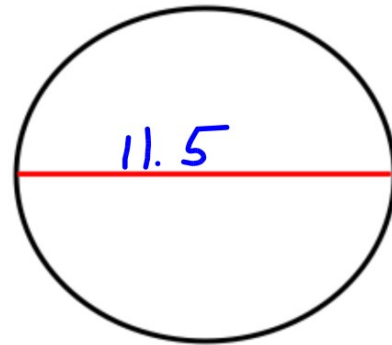
$$\begin{aligned} \text{b) } A &= \pi \times r \times r \\ &= 3.14 \times 5 \times 5 \\ &= 78.5 \text{ cm}^2 \end{aligned}$$

5. In the biathlon, athletes shoot at targets. Find the area of each target.
- The target for the athlete who is standing is a circle with diameter 11.5 cm.
  - The target for the athlete who is lying down is a circle with diameter 4.5 cm.
- Give the answers to the nearest square centimetre.

5a) Diameter = 11.5 cm

$$r = \frac{11.5}{2}$$

$$= 5.75 \text{ cm}$$



$$A = \pi \times r \times r$$

$$= 3.14 \times 5.75 \times 5.75$$

$$= 103.8 \text{ cm}^2 \quad \text{or } 104 \text{ cm}^2$$

b) D = 4.5

$$r = \frac{4.5}{2}$$

$$= 2.25$$

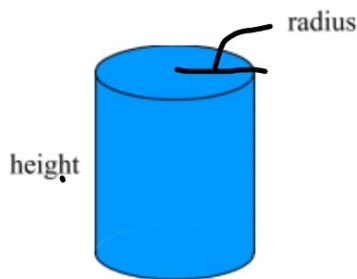
$$A = \pi \times r \times r$$

$$= 3.14 \times 2.25 \times 2.25$$

$$= 15.89 \text{ cm}^2 \quad \text{or } 16 \text{ cm}^2$$

**Surface Area of a Cylinder**

When finding the surface area of a cylinder, you still have to find the area of the faces then add them. However, what are the shapes of the faces?



The top and bottom are both \_\_\_\_\_

If you unroll the curved face of the cylinder, you will get a \_\_\_\_\_

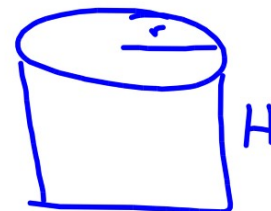
One side of the \_\_\_\_\_ is the \_\_\_\_\_ of the cylinder,  
and  
the other side of the \_\_\_\_\_ is the \_\_\_\_\_ of the circle

- Step 1) Find the area of the circle
- Step 2) Find the circumference of the circle
- Step 3) Find the area of the rectangle  $A = b \times h$

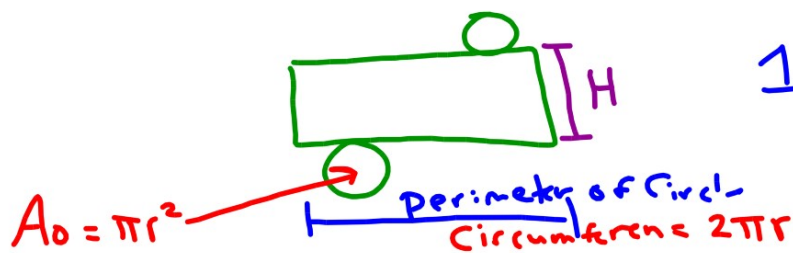
= circumference x h

Step 4) Find the Total SA = 2Circles + Rectangle

$$SA_{cyl} = 2\pi r^2 + 2\pi rH$$



# Net of Cylinder



2 circle

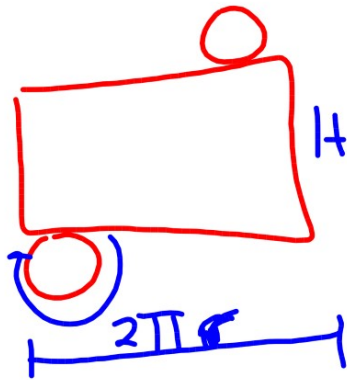
1 Rectangle

$$A_{\square} = b \times h$$

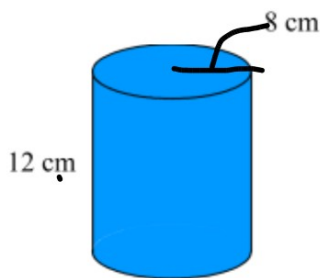
$$(2\pi r) \times h$$

2 circle + Rectangle

$$2\pi r^2 + 2\pi r h$$



$$\text{Total SA} = 2 \text{ circles} + \text{Rectangle}$$
$$2\pi r^2 + 2\pi r H_{\text{prism}}$$



Given  
 $r = 8 \text{ cm}$   
 $H = 12 \text{ cm}$

BEDMAS

Step 1) Find the area of the circle

Step 2) Find the circumference of the circle

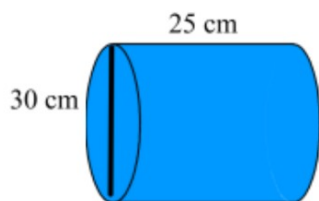
Step 3) Find the area of the rectangle  $A = b \times h$

= circumf

Step 4) Find the Total SA = 2Circles + Rectangle

$$\begin{aligned}
 SA_{\text{cyl}} &= 2\pi r^2 + 2\pi rH \\
 &= 2(3.14)(8\text{cm})^2 + 2(3.14)(8\text{cm})(12\text{cm}) \\
 &= 2(3.14)(64\text{cm}^2) + 2(3.14)(8\text{cm})(12\text{cm}) \\
 &= 401.92\text{cm}^2 + 602.88\text{cm}^2 \\
 &= 1004.8\text{cm}^2
 \end{aligned}$$

Find the surface area

**Your Turn**Given

$$d = 30 \text{ cm}$$



$$r = 15 \text{ cm}$$

$$H = 25 \text{ cm}$$

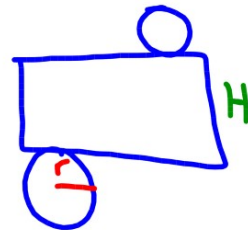
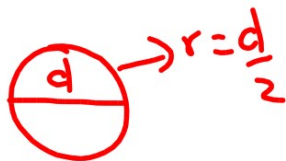
$$\begin{aligned}
 SA_{cy} &= 2\pi r^2 + 2\pi r H \\
 &= 2(3.14)(15 \text{ cm})^2 + 2(3.14)(15 \text{ cm})(25 \text{ cm}) \\
 &= 2(3.14)(225 \text{ cm}^2) + 2(3.14)(15 \text{ cm})(25 \text{ cm}) \\
 &= 1413 \text{ cm}^2 + 2355 \text{ cm}^2 \\
 &= 3768 \text{ cm}^2
 \end{aligned}$$

# Class/Homework

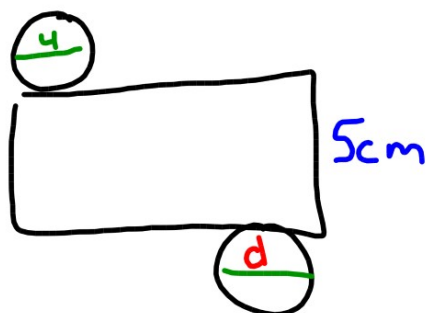
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# 4 and 6

$$SA_{cy} = 2\pi r^2 + 2\pi r H$$



4 a)



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# 4 and 6

$$D = 4 \text{ cm} \quad \downarrow \div 2$$

$$R = 2 \text{ cm}$$

$$H = 5 \text{ cm}$$

$$2\pi r^2 + 2\pi r h$$

$$2(3.14)(2)^2 + 2(3.14)(2)(5)$$

$$2 \times (3.14) \times 4 + 2 \times (3.14) \times (2) \times (5)$$