



Circumference (perimeter) of a Circle

The distance around the outside of a circle is called the circumference.

If we measure the circumference of a circle and divide it by the diameter of the circle (distance across the circle through the centre) we always get the same result (depending on how accurate your measuring is).

This result is approximately 3.141 59... which is represented by the Greek letter π (pronounced Pi).

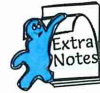


$$\frac{\text{Circumference}}{\text{Diameter}} = \pi$$

We write this formula as $\frac{C}{d} = \pi$, which we can rearrange by multiplying through by d to get $C = \pi d$.

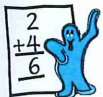
Circumference is measured in linear units i.e. mm, cm, m.

Sometimes you may be given the radius of the circle rather than the diameter when calculating the circumference. Remember if this occurs you need to double the radius to get the diameter.



An alternate formula for calculating the circumference of a circle, given the radius, is $C = 2\pi r$.

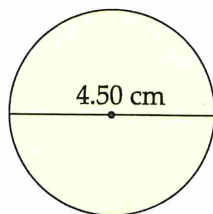
This is the same formula as $C = \pi d$, except d is replaced by $2r$ (since the diameter = 2 times the radius).



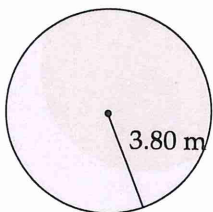
Example

Find the circumference (perimeter) of the following.

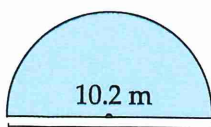
a)



b)



c)



a)

$$\begin{aligned} C &= \pi d \\ &= \pi \times 4.50 \\ &= 3.1415... \times 4.50 \\ &= 14.137\ 16... \\ &= 14.1\ \text{cm (3 sf)} \end{aligned}$$

b)

$$\begin{aligned} C &= \pi d \\ &= \pi \times 7.60 \quad (\text{since } 3.80 \times 2 = 7.60) \\ &= 3.1415... \times 7.60 \\ &= 23.876\ 10... \\ &= 23.9\ \text{m (3 sf)} \end{aligned}$$

c)

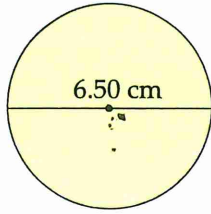
$$\begin{aligned} C &= (\pi \times 10.2) \div 2 + 10.2 \\ &= (3.1415... \times 10.2) \div 2 + 10.2 \\ &= 26.222... \\ &= 26.2\ \text{m (3 sf)} \end{aligned}$$

Note: Since we only require the circumference of half a circle we divide by 2, but we also have to add 10.2 to allow for this length.

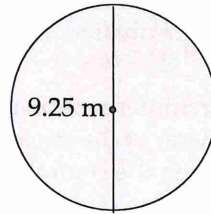


Achievement – Find the circumference (perimeter) of the following. Round your answers to 3 sf.

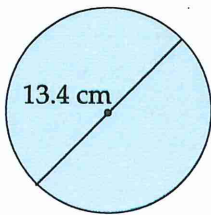
155.



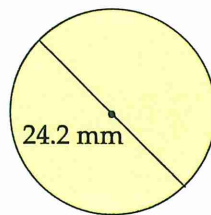
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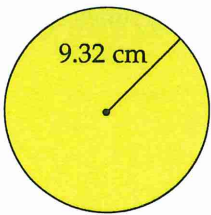
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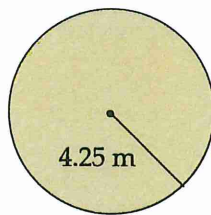
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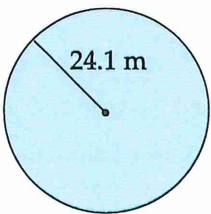
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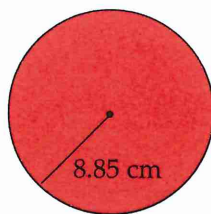
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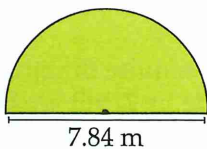
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162.



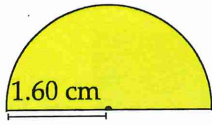
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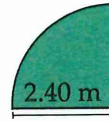


Merit – Find the circumference (perimeter) of the following. Round your answers to 3 sf.

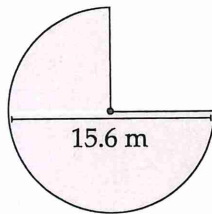
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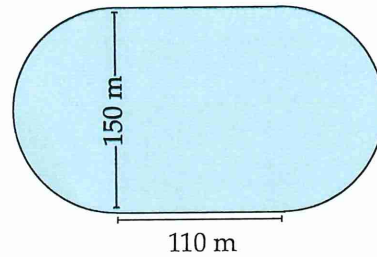
165.



166.



167.



Answer the following questions.

168. A circular swimming pool has a radius of 3.4 m. What is the circumference of the pool?

169. The diameter of the wheel of a bike is 0.85 m. If the distance a student has to travel to school is 1.2 km, how many times will the bike wheel turn?

170. A semi circular window has a diameter of 2.35 m. The window is to be edged with a timber beading. How much beading is required?

171. The spray from a spinning sprinkler makes a circle with radius 8.65 m. What is the circumference of the circle formed?

172. A ferris wheel has a radius of 14.6 m. How many times must it rotate to cover 1 km?

173. If a tree has a circumference of 8.45 m what is its diameter?
