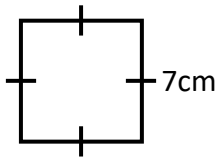
Areas of Circles

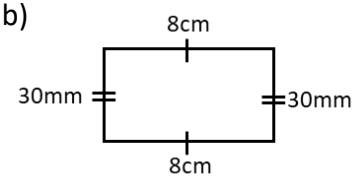
1. Factual recall

Calculate the area of these shapes:

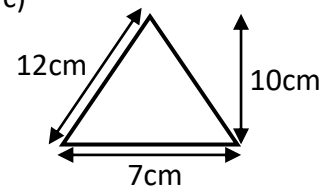
a)



b)



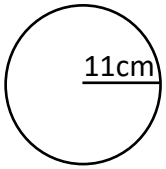
c)



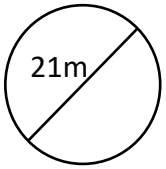
2. Carry out a routine procedure

Calculate the area.
Leave your answer to 2 d.p.

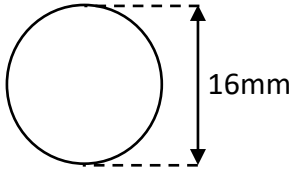
a)



b)

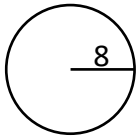
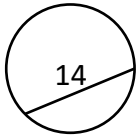
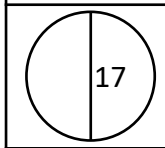


c)



3. Classify some mathematical object

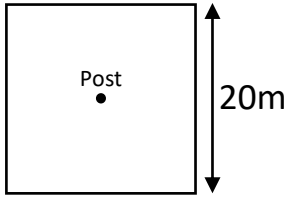
State whether the following calculations for the area are true or false.

Circle	Calculation
	$A = \pi \times 8^2$ $A = \pi \times 16$ ⋮
	$A = \pi \times 7^2$ ⋮
	$A = \pi \times 17^2$ ⋮

4. Interpret a situation or answer

A sheep is tethered to a post by a rope of length 9m, at the centre of a square field. (See the diagram below).

What percentage of the field can the sheep graze on?



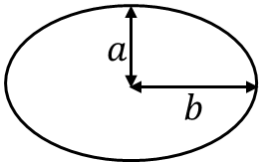
5. Prove, show, justify

The circumference of a circle has a length of $56.549cm$.

Show that the area of this same circle is $254.47cm^2$ when rounded to 2 d.p.

6. Extend a concept

The area of an ellipse is given by the formula:



$$A = \pi ab$$

Assuming the earth takes an elliptical orbit around the sun, with the sun at the centre of the ellipse. Calculate the area bounded by the earth's orbit.

Maximum distance from the sun:
$= 1.52 \times 10^8$ Km
Minimum distance from the sun:
$= 1.47 \times 10^8$ Km

7. Construct an instance

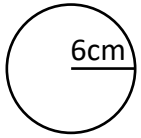
The area of a circle is $452.39\ cm^2$ rounded to 2 d.p.

Sketch the circle and label it with the radius.

8. Criticise a fallacy

A student attempted the following question:

> Calculate the area of the circle.
> Leave your answer to 2 d.p.



$A = \pi r^2$
$= \pi \times 6^2$
$= 113.09733\ldots$
$= 113.09\ cm^2$

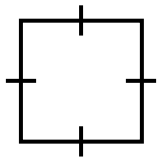
Are they correct? Explain.

Areas of Circles

1. Factual recall

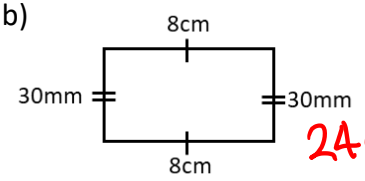
Calculate the area of these shapes:

a)



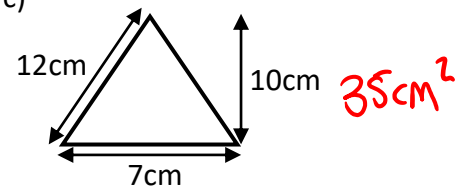
$49cm^2$

b)



$24cm^2$

c)

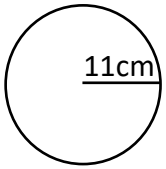


$35cm^2$

2. Carry out a routine procedure

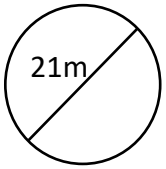
Calculate the area.
Leave your answer to 2 d.p.

a)



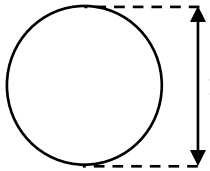
$380.13cm^2$

b)



$346.36m^2$

c)



$201.06\ mm^2$

3. Classify some mathematical object

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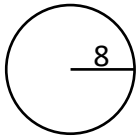
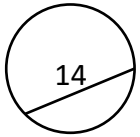
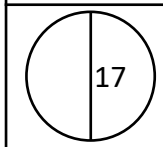
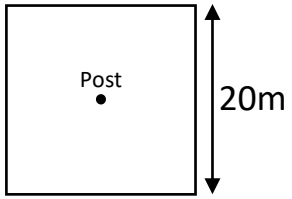
	$A = \pi \times 8^2$ $A = \pi \times 16$ $\vdots$ F
	$A = \pi \times 7^2$ $\vdots$ F
	$A = \pi \times 17^2$ $\vdots$ F

4. Interpret a situation or answer

A sheep is tethered to a post by a rope of length 9m, at the centre of a square field. (See the diagram below).

What percentage of the field can the sheep graze on?



$A_C = \pi \times 9^2 = 81\pi$

$A_S = 20^2 = 400$

$\frac{81\pi}{400} \times 100 = 63.6\%$

5. Prove, show, justify

The circumference of a circle has a length of $56.549cm$.

Show that the area of this same circle is $254.47cm^2$ when rounded to 2 d.p.

$\pi d = 56.549$ $\div \pi$

$d \approx 18$

$r \approx 9$

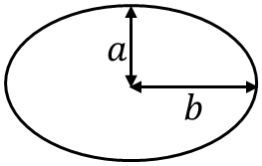
$A = \pi r^2$

$= \pi \times 9^2$

$= 254.47\ cm^2$

6. Extend a concept

The area of an ellipse is given by the formula:



$A = \pi ab$

Assuming the earth takes an elliptical orbit around the sun, with the sun at the centre of the ellipse. Calculate the area bounded by the earth's orbit.

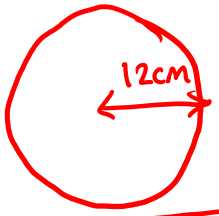
Maximum distance from the sun:
$= 1.52 \times 10^8$ Km $= b$

Minimum distance from the sun:
$= 1.47 \times 10^8$ Km $= a$

7. Construct an instance

The area of a circle is $452.39\ cm^2$ rounded to 2 d.p.

Sketch the circle and label it with the radius.



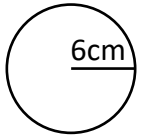
$A = \pi \times a \times b$

$= 7.02 \times 10^{16}\ Km^2$

8. Criticise a fallacy

A student attempted the following question:

> Calculate the area of the circle.
> Leave your answer to 2 d.p.



$A = \pi r^2$

$= \pi \times 6^2$

$= 113.09733\ldots$

$= 113.09\ cm^2$

Are they correct? Explain.

Rounded incorrectly should be $113.10cm^2$