

Reasoning and Problem Solving

Step 4: Circles

National Curriculum Objectives:

Mathematics Year 6: (6G5) [Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Explain if a statement about the radius or diameter of a circle is correct, where the radius is directly divisible by 2. Measurements given in whole mm, cm and m.

Expected Explain if a statement about the radius or diameter of a circle is correct, where the radius or diameter is not always a whole number. Measurements given in whole mm, cm and m.

Greater Depth Explain if a statement about the radius or diameter of a circle is correct, where the radius or diameter is not always a whole number, and is sometimes presented as a fraction. Measurements given in whole mm, cm and m and may need converting.

Questions 2, 5 and 8 (Reasoning)

Developing Explain how the radius or diameter has been calculated, where the radius is directly divisible by 2. Measurements given in whole mm, cm and m.

Expected Explain how the radius or diameter has been calculated, where the radius or diameter is not always a whole number. Measurements given in whole mm, cm and m.

Greater Depth Explain how the radius or diameter has been calculated, where the radius or diameter is not always a whole number, and is sometimes presented as a fraction. Measurements given in whole mm, cm and m and may need converting.

Questions 3, 6 and 9 (Problem Solving)

Developing Find the radius and diameter of circular objects using given guidelines, where the radius is directly divisible by 2. Measurements given in whole mm, cm and m.

Expected Find the radius and diameter of circular objects using given guidelines, where the radius or diameter is not always a whole number. Measurements given in whole mm, cm and m.

Greater Depth Find the radius and diameter of circular objects using given guidelines, where the radius or diameter is not always a whole number, and is sometimes presented as a fraction. Measurements given in whole mm, cm and m and may need converting.

More [Year 6 Statistics](#) resources.

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Circles

1a. Jeremy says,



If the radius of a circle is 11cm then the diameter must be 20cm.

Is he correct?

Explain your answer.



R

Circles

1b. Dion says,



If the diameter of a circle is 26cm then the radius must be 12cm.

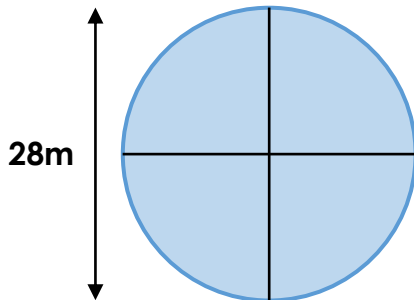
Is he correct?

Explain your answer.



R

2a. Find the radius of the glass in the window.



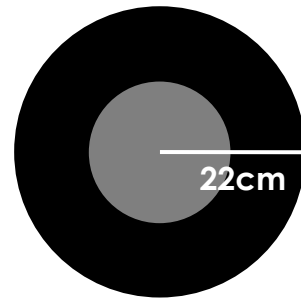
Explain how you know.



Diagram not to scale

R

2b. Find the diameter of the wheel.



Explain how you know.



Diagram not to scale

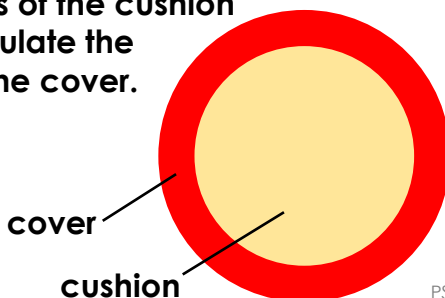
R

3a. A cushion needs a larger cover.

The cover is $\frac{1}{4}$ bigger than the cushion.

i) If the cushion diameter is 40cm, calculate the cover diameter.

ii) If the radius of the cushion is 12cm, calculate the diameter of the cover.



PS

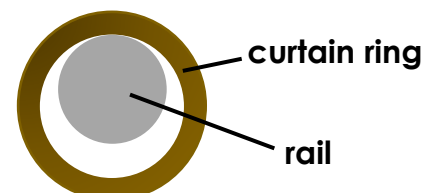


3b. New curtain rings are needed for a rail.

Each ring is $\frac{1}{4}$ bigger than the rail.

i) Calculate the diameter of the curtain ring if the rail radius is 30mm.

ii) If the rail had a diameter of 64mm, what will the radius of the curtain ring be?

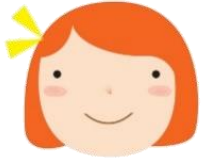


PS



Circles

4a. Amelia says,



If the radius of a circle is 67.5mm then the diameter must be 130mm.

Is she correct?

Explain your answer.



R

Circles

4b. Jessie says,



If the diameter of a circle is 99cm then the radius must be 50cm.

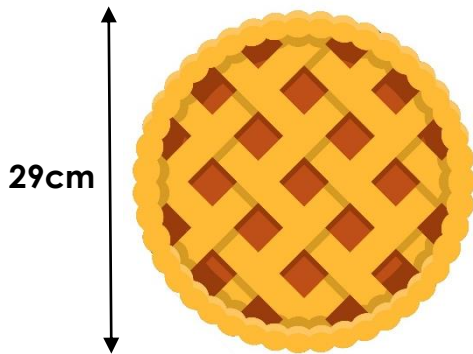
Is she correct?

Explain your answer.



R

5a. Find the radius of the pie.



Explain how you know.



Diagram not to scale

R

5b. Find the diameter of the pizza.



Explain how you know.



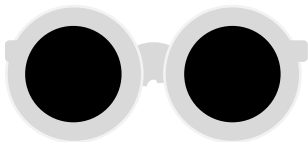
Diagram not to scale

R

6a. New lenses are needed for some glasses.

The frames must be $\frac{1}{7}$ bigger than the lenses.

Calculate the missing sizes.



Lens Radius	Frame Diameter
28mm	
35mm	



PS

6b. There is a hoop on a buzzer game.

The hoop must be $\frac{1}{5}$ bigger than the wire.

Calculate the missing sizes.



Wire Radius	Hoop Diameter
35mm	
55mm	



PS

Circles

Circles

7a. Grace says,



If the radius of a circle is 795mm then the diameter must be 15.9cm.

Is she correct?

Explain your answer.



R

7b. Ali says,



If the diameter of a circle is 1.07m then the radius must be 51.5cm.

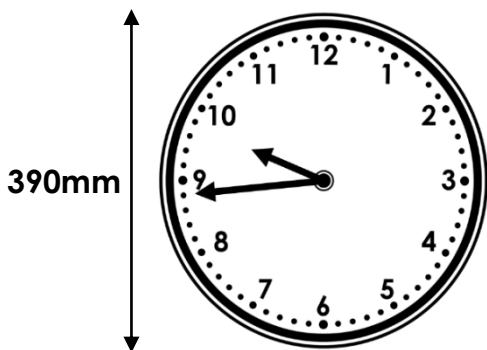
Is he correct?

Explain your answer.



R

8a. Find the radius of the clock face in cm.



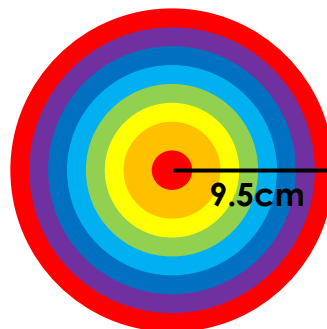
Explain how you know.



Diagram not to scale

R

8b. Find the diameter of the rainbow rubber in mm.



Explain how you know.



Diagram not to scale

R

9a. The diameter of each cellophane wrapper needs to be 39mm larger than the diameter of the trinket.

Trinket Radius	Cellophane Diameter	Number per metre
1.2cm		
3.6cm		
4.9cm		

If the cellophane is 1m wide, calculate the number of trinket wrappers that can fit on one row.



PS

9b. The diameter of each fairy cake topper needs to be 12mm larger than the radius of the fairy cake.

Fairy Cake Diameter	Cake Topper Diameter	Number per 50cm
5.2cm		
4.6cm		
4.4cm		

If fairy cake toppers are stamped from a 50cm wide piece of material, calculate the number of toppers that can fit on one row.



PS

Reasoning and Problem Solving Circles

Developing

- 1a. Jeremy is not correct because the diameter is always double the length of the radius, so it would be 22cm.
- 2a. The radius is 14m because it is half of the diameter which is 28m.
- 3a. i) 50cm
ii) 30cm

Expected

- 4a. Amelia is not correct because the diameter is always double the length of the radius, so it would be 135mm.
- 5a. The radius is 14.5cm because it is half of the diameter which is 29cm.
- 6a. 64mm, 80mm

Greater Depth

- 7a. Grace is not correct because she has converted the units incorrectly. The diameter would be 159cm.
- 8a. The radius is 19.5cm because it is half of the diameter which is 390mm.
- 9a. 6.3cm, 15; 11.1cm, 9; 13.7cm, 7

Reasoning and Problem Solving Circles

Developing

- 1b. Dion is not correct because the radius is always half the length of the diameter, so it would be 13cm.
- 2b. The diameter is 44cm because it is double the radius which is 22cm.
- 3b. i) 75mm
ii) 40mm

Expected

- 4b. Jessie is not correct because the radius is always half the length of the diameter, so it would be 49.5cm.
- 5b. The diameter is 350mm because it is double the radius which is 175mm.
- 6b. 84mm, 132mm

Greater Depth

- 7b. Ali is not correct because the radius is always half the length of the diameter, so it would be 53.5cm.
- 8b. The diameter is 190mm because it is double the radius which is 9.5cm.
- 9b. 3.8cm, 13; 3.5cm, 14; 3.4cm, 14