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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Reasoning and Problem Solving – Circles – Teaching Information

Circles

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

1b. Dion says:

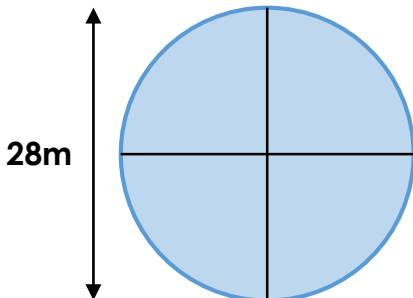> If the diameter of a circle is 26cm then the radius must be 12cm.

Is he correct?

Explain your answer.

R

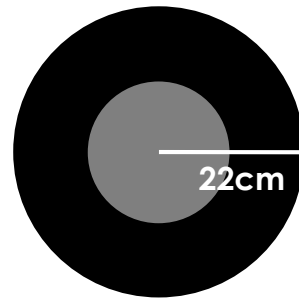**2a.** Find the radius of the glass in the window.

28m

Explain how you know.

Diagram not to scale

R

2b. Find the diameter of the wheel.

22cm

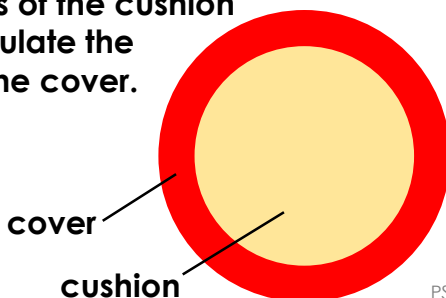Explain how you know.

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.

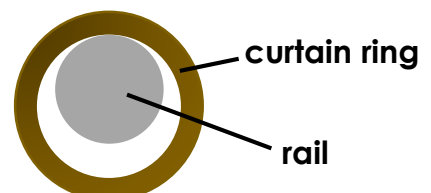ii) If the radius of the cushion is 12cm, calculate the diameter of the cover.

cover

cushion

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 rail if the curtain ring radius is 20mm.

ii) If the curtain ring has a radius of 32mm, what will the radius of the rail be?

curtain ring

rail

PS

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Reasoning and Problem Solving – Circles – Year 6 Developing

Circles

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.

4b. Jessie says:

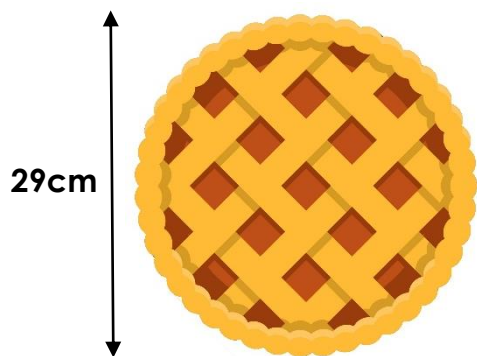> If the diameter of a circle is 99cm then the radius must be 50cm.

Is she correct?

Explain your answer.

5a. Find the radius of the pie.

29cm

Explain how you know.

Diagram not to scale

5b. Find the diameter of the pizza.
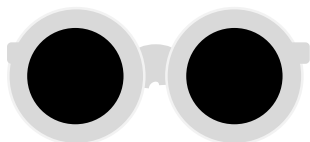
175mm

Explain how you know.

Diagram not to scale

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
	42mm
28mm	

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	
	90mm
55mm	
	65mm

7a. Grace says:

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

Is she correct?

Explain your answer.

GD   R

7b. Ali says:

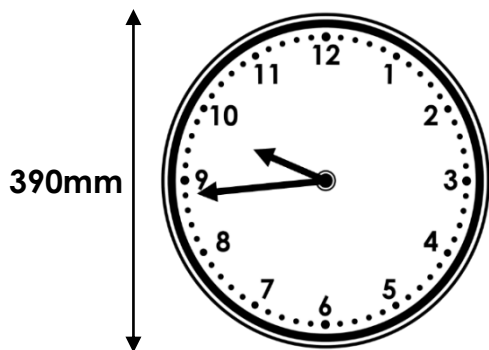> If the diameter of a circle is 1.07m then the radius must be 51.5cm.

Is he correct?

Explain your answer.
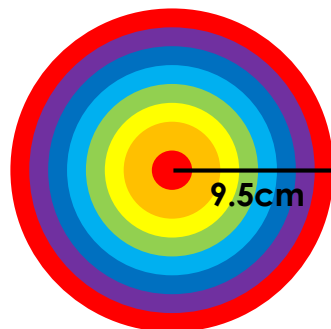
GD   R

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

390mm

Explain how you know.

GD   *Diagram not to scale*   R

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

9.5cm

Explain how you know.

GD   *Diagram not to scale*   R

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

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

Calculate the amount of sweet wrappers that 1m of cellophane could produce.

GD   PS

9b. The outer wall diameter of a pipe is 30% bigger than the width of the inner wall.

Inner Radius	Outer Diameter
40mm	
50mm	
60mm	

Calculate the missing sizes in cm.

GD   PS

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Reasoning and Problem Solving – Circles – Year 6 Greater Depth

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. 18mm, 64mm

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

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) 30mm
ii) 24mm

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, 36mm, 132mm, 26mm

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. 10.4cm, 13cm, 15.6cm

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Reasoning and Problem Solving – Circles ANSWERS