

Circle Geometry (not on syllabus)

Pre-requisites:

- ✓ Perimeter and Area
- ✓ Direct Proportion
- ✓ Multiplication of Fractions

Topics:

- ✓ Parts of a Circle -Vocabulary
- ✓ Relationships between diameter and radius
- ✓ Relationship between diameter and circumference.
- ✓ Calculating the diameter and radius from the circumference.
- ✓ Calculating the perimeter of semi-circles and compound shapes.

Skill 1: Doubling and halving numbers

1) 16	2) 20	3) 40
4) 24	5) 30	6) 36
7) 52	8) 56	9) 84
10) 27	11) 124	12) 45
13) 130	14) 123	15) 300
16) 215	17) 141	18) 153

Try these:

$\frac{2}{5}$	$2\frac{3}{15}$	$2\frac{5}{10}$
$2\frac{1}{7}$	$1\frac{6}{8}$	$3\frac{2}{3}$

Skill 2: Think aloud using doubling and halving to solve each problem.

- 1) $15 \times 8 = 30 \times \square$ (2) $24 \times 12 = 48 \times \square$ (3) $36 \times 5 = \square \times 10$
4) $45 \times \square = 90 \times 9$ (5) $48 \times \square = 12 \times 12$ (6) $\square \times 16 = 8 \times 8$
7) $23 \times \square = 46 \times 10$ (8) $65 \times 12 = \square \times 6$ (9) $35 \times 14 = 70 \times \square$

Skill 3: Multiplication of fractions and decimals

What is $\frac{3}{8}$, **2 times**? What is ..., times? Try these:

$\frac{5}{7}$, **4 times**; $12, \frac{1}{2}$ times; $28, \frac{3}{4}$ times; $25, 2\frac{2}{5}$ times;

3.5, 3 times; **1.2, 2.6 times**; **4.2, 3.14 times**;

S.E.A Application Problems – You have eight (10) minutes to do the next three (4) questions.

1. Charmain mixed 0.55 litres of sugar syrup with 1.85 Litres of water. The mixture is then poured into bottles of 700 ml each. How much mixture is left over? (3 mks)



2. Alex, Ben and Carl collected 302 bookmarks. Alex had 18 more bookmarks than Ben. Carl had 3 times as many bookmarks as Alex. How many bookmarks did Carl collect?

Blank dashed box for the solution to question 2.

3. 40% of the pupils in the hall are girls. There are 1047 boys. How many pupils are there altogether? (3 mks)

Blank dashed box for the solution to question 3.

4. Bryan had $\frac{4}{7}$ as much money as Candy at first. When Candy gave \$45 from her money to Bryan, they had the same amount of money.

a) What fraction of money did Bryan get from Candy? (2mks)

Blank dashed box for the solution to question 4a.

b) How much money did Bryan have at first? (2 mks)

Blank dashed box for the solution to question 4b.

c) How much did both children have altogether? (1mk)

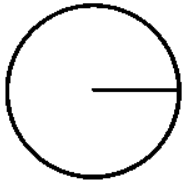
Blank dashed box for the solution to question 4c.

Parts of a Circle: Vocabulary

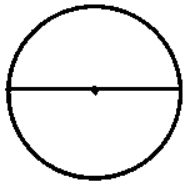
MATH FACT #: The parts of a circle are:

Radius	Diameter	Circumference	Chord
Arc	Tangent	Segment	sector

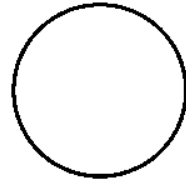
Parts of a Circle



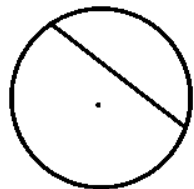
Radius



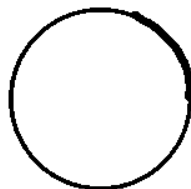
Diameter



Circumference



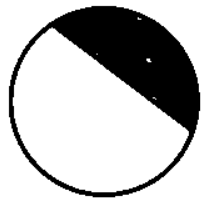
Chord



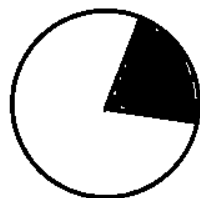
Arc



Tangent



Segment



Sector

Important parts of a circle

- **A radius** is a line that starts at the centre of a circle and ends at the edge of the circle.
- **A diameter** is a line that cuts the circle in two. A diameter always passes through the centre of the circle.
- **The circumference** is the perimeter or around the circle.
- **An Arc** is any part of the circumference.

Other parts of a circle (not necessary)

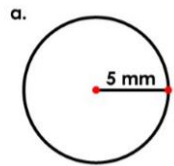
- A chord is any line that starts at one edge of the circle and goes to another edge of the circle.
- A tangent is a line that passes alongside the circle and touches one part of its circumference.
- A sector is fraction of the circle formed by two radii and an arc.
- A segment is a fraction of the circle formed by a chord and an arc.

Exploring the relationship between diameter and radius

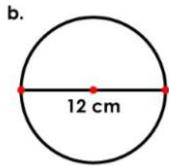
MATH FACT #: Relationship between radius and diameter

The radius of a circle is half of the diameter of that circle.
In other words, the diameter of the circle is twice the length of the radius.

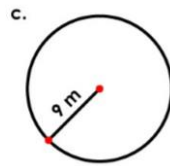
5. Calculate the diameter or radius of the following circles



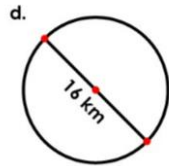
Radius = ____
Diameter = ____



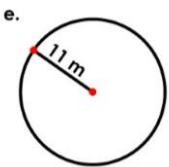
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Diameter = ____



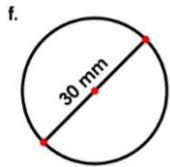
Radius = ____
Diameter = ____



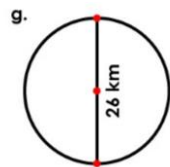
Radius = ____
Diameter = ____



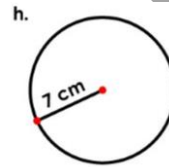
Radius = ____
Diameter = ____



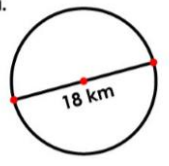
Radius = ____
Diameter = ____



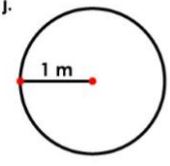
Radius = ____
Diameter = ____



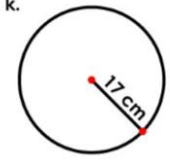
Radius = ____
Diameter = ____



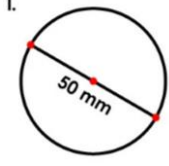
Radius = ____
Diameter = ____



Radius = ____
Diameter = ____



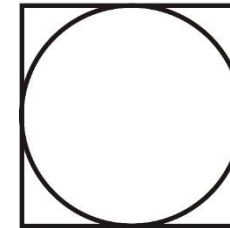
Radius = ____
Diameter = ____



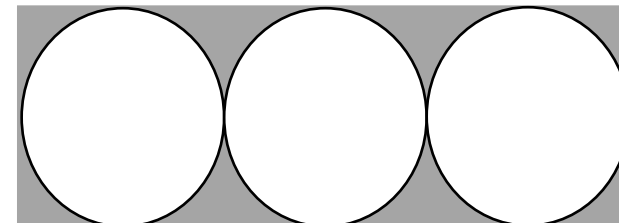
Radius = ____
Diameter = ____

WORDED PROBLEMS

6. John has a round swimming pool. The distance from the centre of the pool to the edge is 3 meters. What is the diameter of John's pool?
7. The picture below shows a circle inside of a square. The square measures 4 cm on each side.
- What is the diameter of the circle?
 - What is the radius of the circle?
 - What is the perimeter of the square?

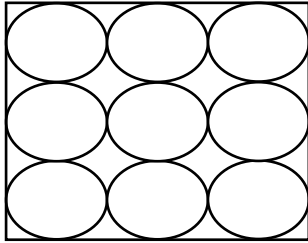


8. The picture shows 3 similar circles placed side by side inside of a rectangle. Calculate:
- the radius of one circle
 - the length and breadth of the rectangle
 - the Perimeter of the rectangle.



9. The picture shows 9 similar circles stacked inside of a square. The square has area 81cm^2 . Calculate:

- g. the length of one side of the square.
- h. the radius of each circle.



Quiz:

1. How can you use the radius to find the diameter?

- a) Half r
- b) $r + 2$
- c) Double r
- d) $4 \times r$
- e) Triple r
- f) $r + r$
- g) Add 2 to r
- h) $2 \times r$

2. How can you use the diameter to find the radius?

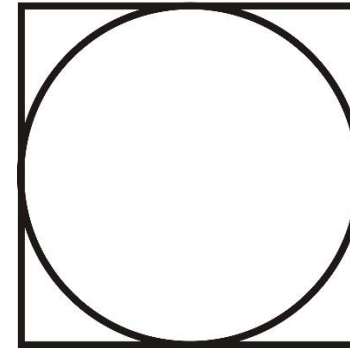
- a) Half d
- b) $d - r$
- c) Double r
- d) $4 \times r$
- e) Triple r
- f) $d + r$
- g) $d + r$
- h) $\frac{1}{2} \times d$

3. What units are used to measure radius and diameter (units, square units or cubic units)? Explain.

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.....

4. If you were to draw a square around a circle, how does the diameter of the circle relate to the length of the square?



- a) The diameter is equal to the length of the radius.
- b) The distance around the circle is the same as the distance around the square.
- c) The radius of the circle is equal to the length of each side of the square
- d) The diameter of the circle is equal to the length of each side of the square.

Exploring the relationship between diameter and circumference.

MATH FACT #: Relationship between diameter and circumference

The circumference of a circle is three and one seventh, $3\frac{1}{7}$ or $\frac{22}{7}$, its diameter.

In other words, the Circumference, $C = D \times 3\frac{1}{7}$ or $C = D \times \frac{22}{7}$

If radius, r is given, calculate for the diameter of the circle.

10. Instructions: Complete the table using the diameter or radius to calculate the circumference

	Radius	Diameter	Circumference
a.		7m	
b.		14m	
c.		35m	
d.	21m		
e.	84m		
f.	$1\frac{5}{11}$ m		
g.			88 m
h.			44 cm
i.			121 cm

WORD PROBLEMS

11. The diameter of a circle measures 1 metre. How many metres is the circle's circumference?

12. From the centre of a circular cycling track to the edge measures is $19\frac{1}{4}$ metres. John cycles around the track on his bicycle 3 times.

- Which part of the circle measures $19\frac{1}{4}$
 - Diameter
 - Circumference
 - Radius
 - Semi-circle
- Calculate the distance John cycles.

13. You buy a can of soup and decide to replace the label with your own. The label goes all the way around the can. If the radius of the can is 4.5cm, what is the length of the label?



14. Arima Stadium decides to try something new: instead of having its current track for running, it is to be replaced with a circular one. The new circular track will allow you to run 1200 metres in 3 laps!

- What will be the circumference of the new track?
- What will be the diameter of the new track?

15. It's Pizza night! You call your Pizza Hut to find out what size of pizza they sell. There are two options: Which would you buy

Option A: Pizza pie with the radius of 10 inches for \$13.95

Option B: Pizza pie with a circumference of 72 inches for \$13.95

Quiz:

Instructions: Choose ONLY one answer.

1. The radius is 8 cm long. How long is the diameter of the circle.
 - a. 16 cm
 - b. 6 cm
 - c. 10 cm
 - d. 4 cm

2. The diameter of a circle is 7cm. What do I have to do to find the radius of the circle?
 - a. Double it
 - b. Half it

3. The diameter of a circle is 2 cm. What is its circumference?
 - a. $2 \times 3\frac{1}{7}$
 - b. $2 + 3\frac{1}{7}$
 - c. $2 \div 3\frac{1}{7}$
 - d. $3\frac{1}{7} - 2$

Property of Kurt Romain

COMPLETED / TO BE ADDED

Calculating the perimeter of semi-circles and compound shapes.

MATH FACT #: A semi-circle is half of a circle's circumference.

Recall that the prefix, "semi" means half.

Activity 1

- Sketch a circle and draw in the diameter.
- Next, draw the number of diameters needed to go around the circle.
- Draw the number of diameters that would be needed to go halfway around the circle.

MATH FACT #: The length of a semi-circle

$$\frac{1}{2} \times \text{Circumference}$$

Activity 2

- Draw a diameter 14m long.
- Next draw a semi-circle above the diameter.
- How many lines did you sketch?

- a) What is the length of the diameter?
- b) What is the length of the semi-circle? Calculate your answer.
- c) What is the perimeter of the entire shape?