

SMILE WORKCARDS

Circle Measurement Pack One

Contents

	Title	Card Number
1	It's not Fair!	2146
2	Circumference	392
3	Making Circles	2142
4	All about Circles	2083
5	Round the Bend	2013
6	Circle Coverage	2149
7	Kit Bag	2060
8	Pizza Paradise	2150
9	Orbits	761

It's not fair!

Smile 2146

You will need string or a tape measure.

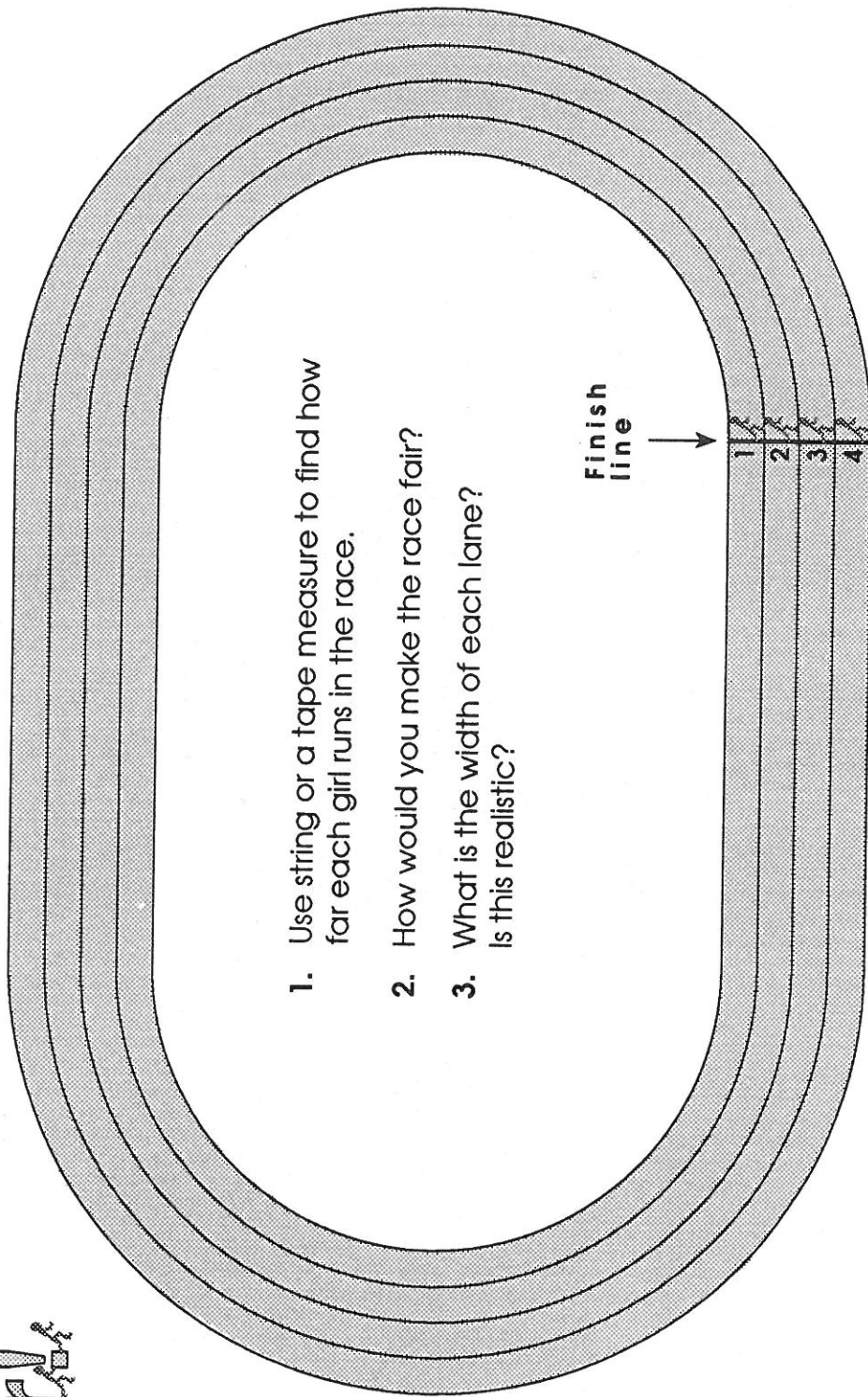
Four girls race around this track, one in each lane.

The winner is the one who gets back to the finish line first.

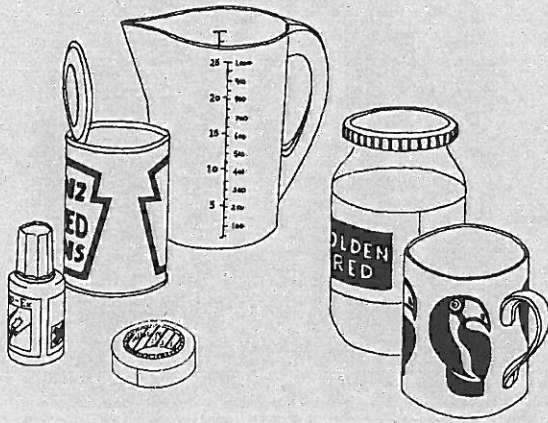
Scale:

1mm represents 1 metre of track.

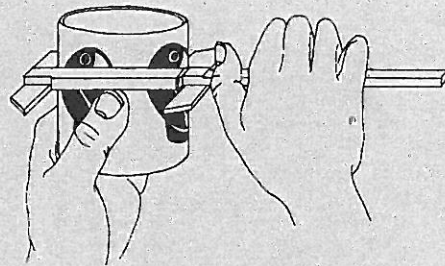
1. Use string or a tape measure to find how far each girl runs in the race.
2. How would you make the race fair?
3. What is the width of each lane?
Is this realistic?



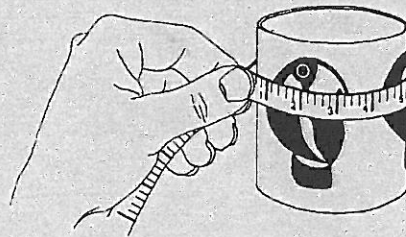
Circumference



Measure the diameter of some round objects.



Measure their circumferences.



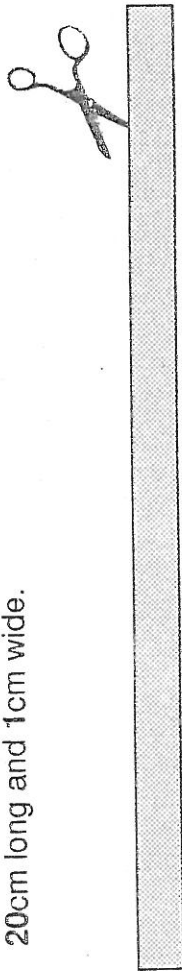
Look at your answers.

What number can you multiply the diameters by to get answers **roughly equal to** the circumference?

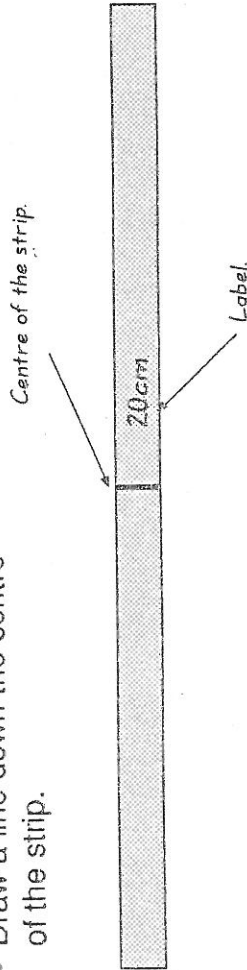
Making Circles

You will need cm² paper, scissors, ruler, sellotape and a calculator.

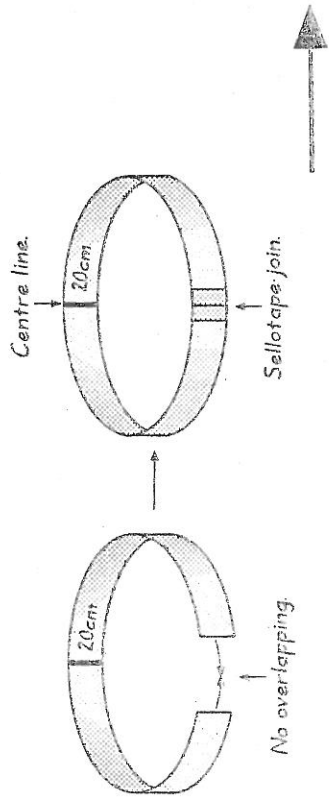
- Cut out a rectangular strip of paper 20cm long and 1cm wide.



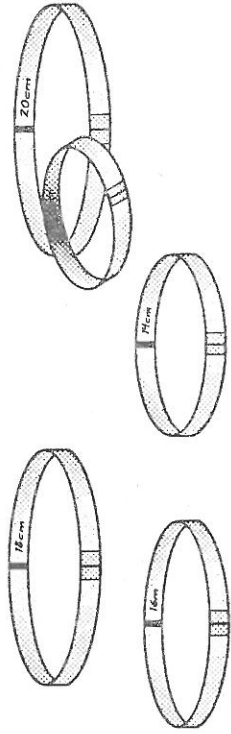
- Draw a line down the centre of the strip.



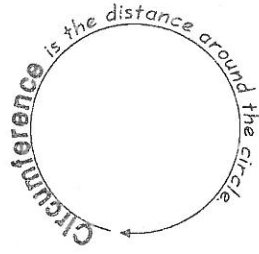
- Label your strip.
- Bend the strip into a circle by carefully joining the ends.



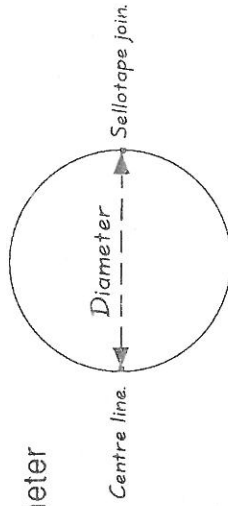
- 2. Cut out some more strips of different lengths.



- Draw a line down the centre of each strip.
- Label the length of each strip.
- Use these strips to make circles.



- 3. Measure the diameter of each circle.



Record the measurements and use them to calculate the **Circumference ÷ Diameter**.

Circumference	Diameter	$C \div D$

- $C \div D$ is approximately 3.
- Are your calculations close to 3?
- If not check your measurements and calculations.

For all circles

$$\text{Circumference} \div \text{Diameter} = \pi \text{ (pi)}$$

$\pi = 3$ correct to 1 significant figure

$\pi = 3.1$ correct to 2 significant figures

$\pi = 3.14$ correct to 3 significant figures

This is π to 100 significant figures.

3.141592653335897933238
 4626433833279502288419
 7169399375105820974494
 4592223078164062862089
 986288034825 . . .

There is no exact value.

- There is a π button on some calculators.
 To how many significant figures is π given on your calculator?

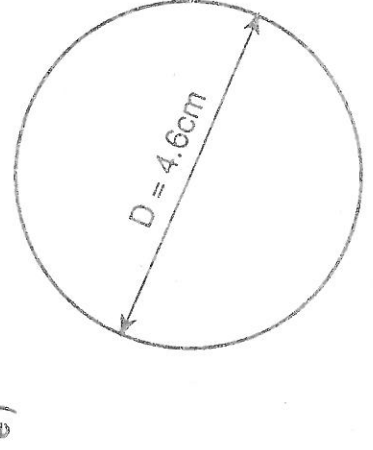
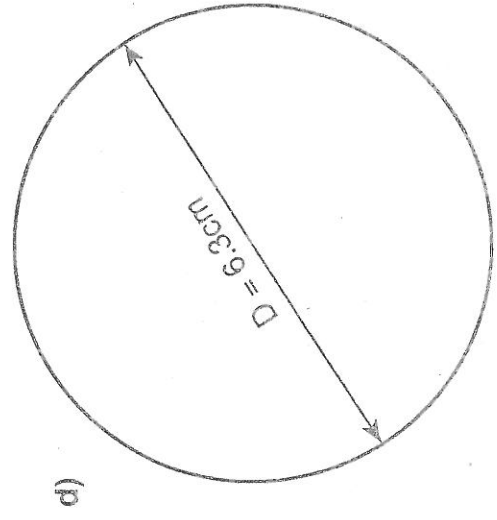
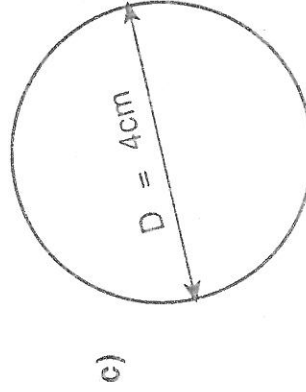
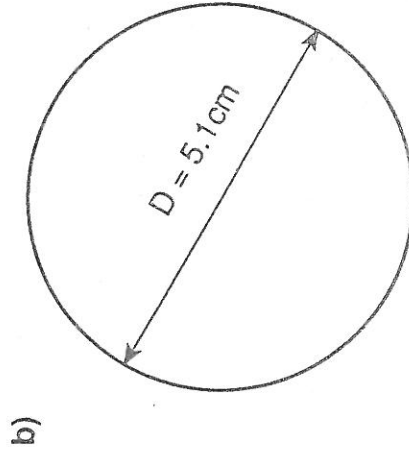
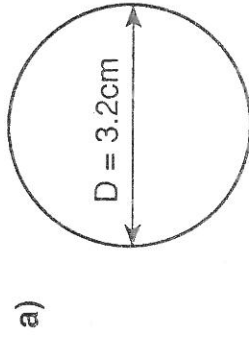
π is the Greek letter P. The first person to use the symbol π was Archimedes (a Greek mathematician) because π is the first letter of perimeter which means perimeter (the perimeter of a circle is called the circumference.)



The formula Circumference \div Diameter = π can be re-arranged to give

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

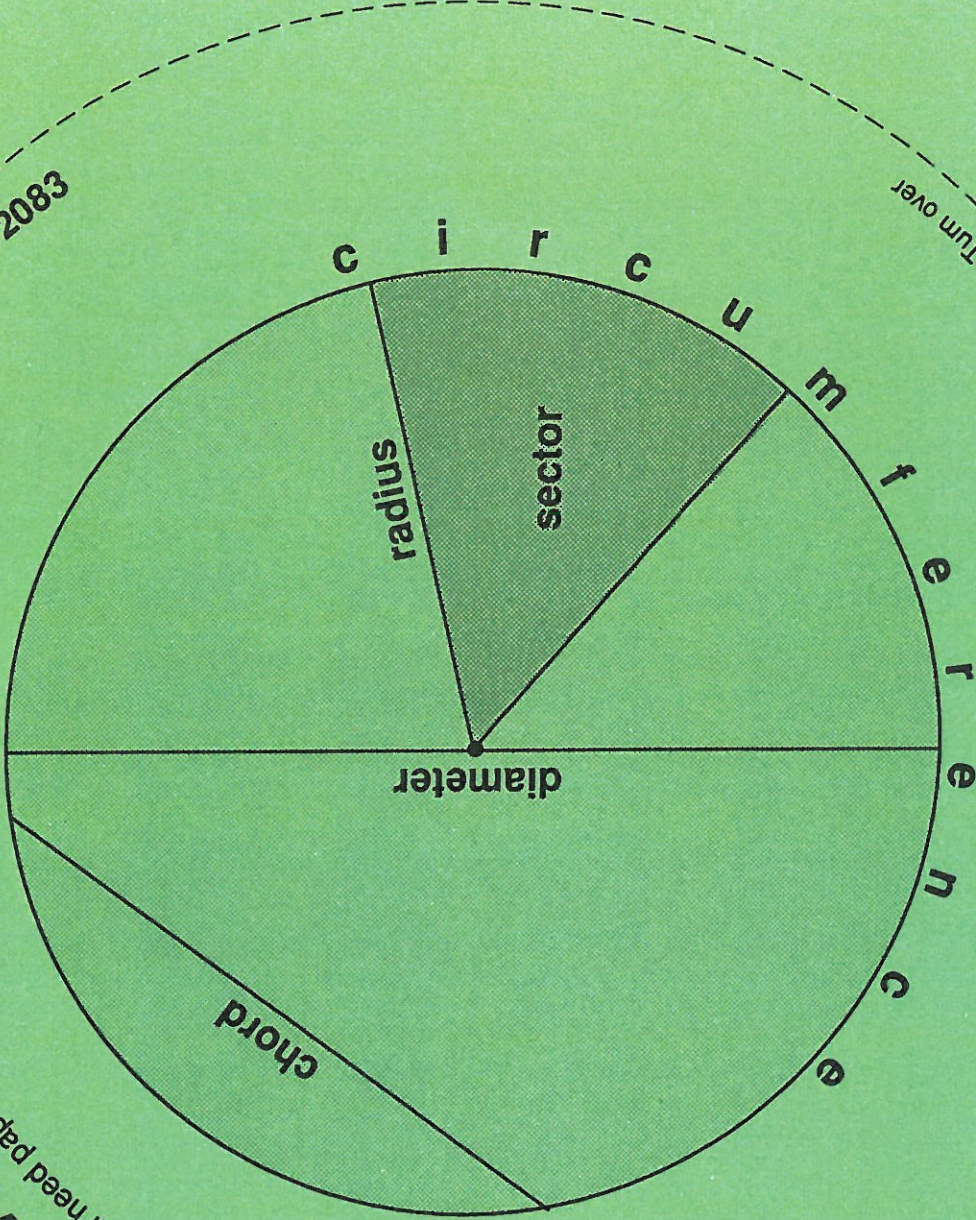
4. Use this formula to calculate the circumference of these circles.
 Use 3.14 or π button on your calculator.



ALL ABOUT CIRCLES

Smile2083

Turn over



You will need paper circles.



ALL ABOUT CIRCLES

2.
How can you find the centre of your paper circle?

3.
How many lines of symmetry does a circle have?

4.
Why does a circle have rotational symmetry?

1.
Fold a circle in half. What do you notice about the fold line? What is this line called?

6.
How would you find the centre of a circle you could not fold?

5.
Mark 2 points anywhere on the circumference of a circle. Fold 1 point on to the other. What do you notice? Now draw a line between the 2 points. What is the line called? Try other pairs of points.

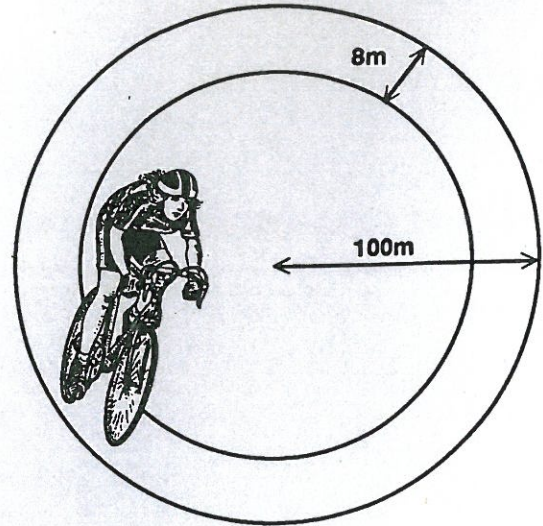
Round the Bend

Smile 2013

Circumference = π x Diameter
 You may have a button marked π on your calculator.
 A reasonable approximation for π (π) is 3.14.



1. The radius of the earth is about 6 400km. How far is it around the equator?

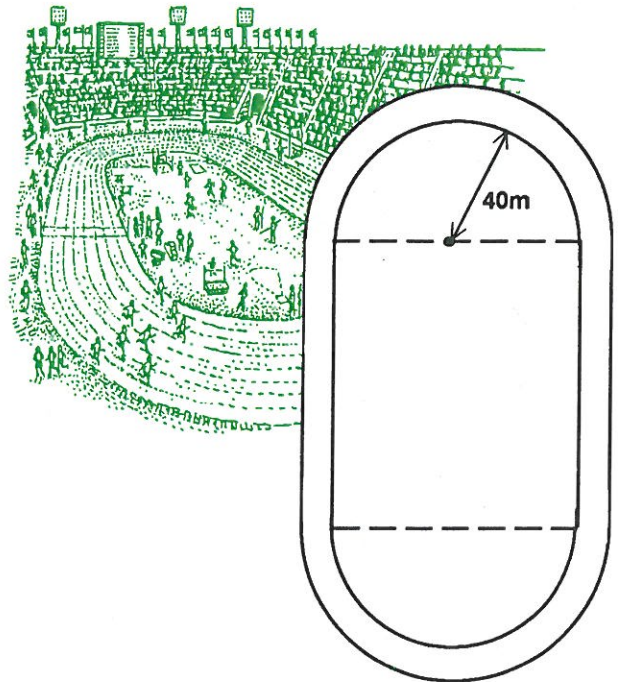


2. How much further does a cyclist go if she keeps to the outside edge of the track rather than the inside?



3. The hour hand of a clock is 5cm long and the minute hand is 10cm long.

- a) How far does the tip of the hour hand move each day?
- b) How far does the tip of the minute hand move each day?



4. The ends of a running track are semi-circles of radius 40m. One complete lap is 400m.

How long are the straights?

Turn over



Area of circle = πr^2

= $\pi \times \text{radius} \times \text{radius}$

An approximation for π (π) correct to 3 decimal places is 3.142.

You may have a button marked π on your calculator.

How many places is this approximation for π correct to?

To find the area of a circle with a radius of 1cm.

Using $\pi = 3.142$.

Area of circle = πr^2
 = $3.142 \times 1 \times 1$
 = 3.142cm^2

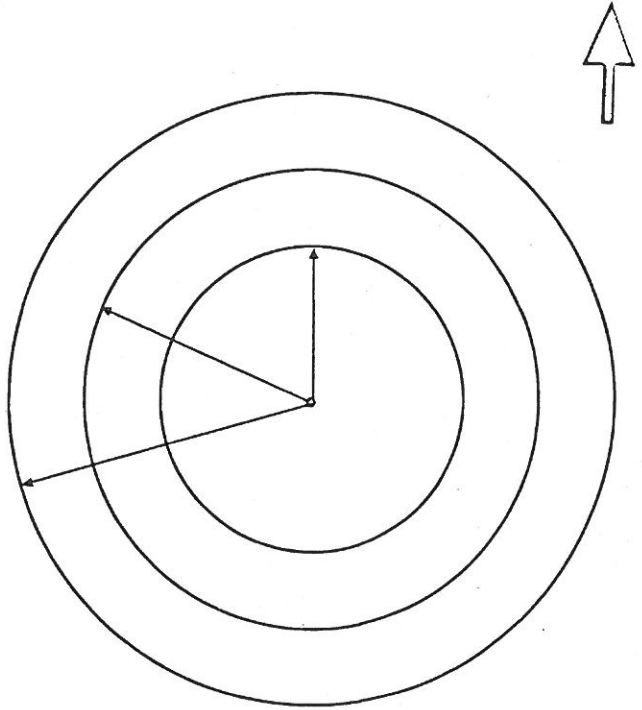
Using π button

Area of circle = πr^2
 = $\pi \times 1 \times 1$
 = 3.1415927cm^2
 = 3.142cm^2 (3 d.p.)

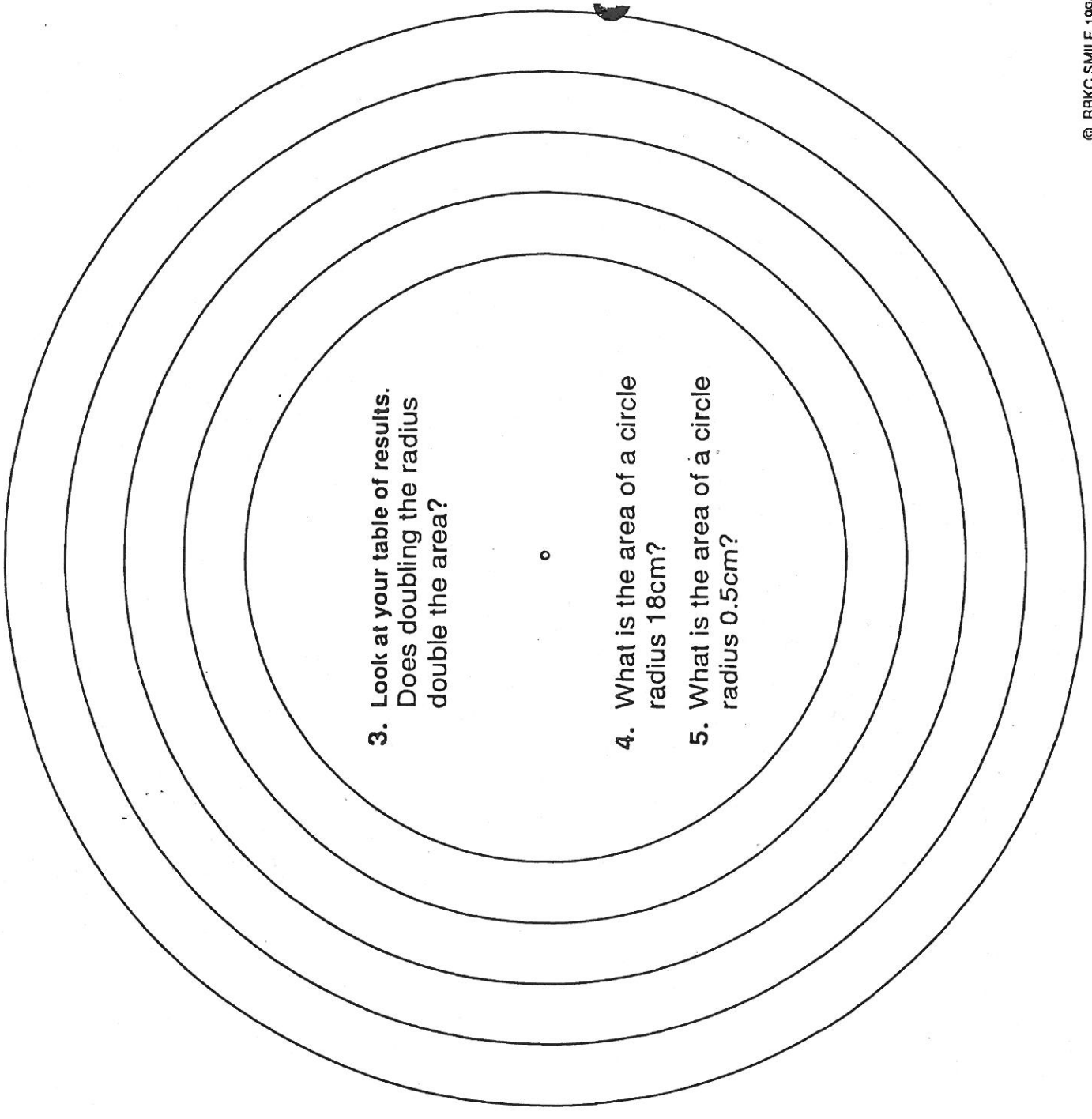
- Calculate the area of these three circles by measuring the radius and using the formula $\text{Area of Circle} = \pi r^2$.

Make a table of radius and area.

Radius	Area
1cm	3.142cm^2
2cm	



2. Calculate the areas of these circles. Record them on your table.



3. Look at your table of results.
Does doubling the radius
double the area?



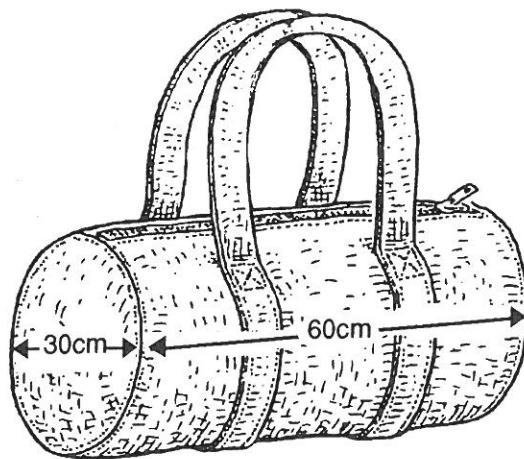
4. What is the area of a circle
radius 18cm?

5. What is the area of a circle
radius 0.5cm?

Kitbag

Can you make a pattern for this kitbag?
You should leave a seam allowance of 2cm.

The length of the strap is four times
the circumference of the bag.
What length of material will you need?



Your cloth is 140cm wide.
Lay out your pattern using as little material as possible.

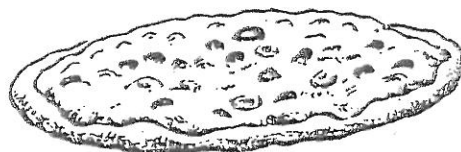
Make a pattern for a pencil case **similar** in shape to the kitbag whose dimensions are $\frac{1}{3}$ of those of the kitbag. Remember your seam allowance must still be 2cm.

6. If you were having a pizza party for 40 people, how many LARGE pizzas would you need?



7. There is a village in Italy having a pizza festival. They are making one giant pizza for 100 people.

PIZZA PARADISE



What is the diameter of the pizza?



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	Diameter
	SMALL.....7 inches
	MEDIUM.....10 inches
	LARGE.....12 inches

1. The SMALL pizza serves 2 people.

Estimate how many people

- a) a MEDIUM pizza would serve?
- b) a LARGE pizza would serve?

2. Work out the area of the three pizzas.

3. Approximately how many times larger is the

- a) MEDIUM pizza than the SMALL pizza?
- b) LARGE pizza than the SMALL pizza?

4. Do you still agree with your estimate?

5. Does doubling the diameter, double the area?

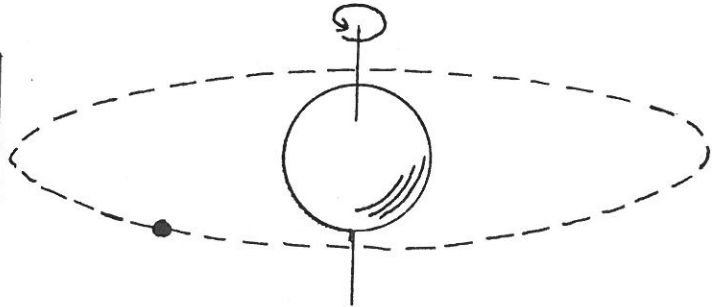


Materials: Electronic calculator

ORBITS

One-quarter of the circumference of the earth, measured through Paris is 10,000km

$$\pi = 3.14 \text{ approximately}$$



- (1) What is the circumference of the earth?
- (2) What is the Diameter of the earth?
- (3) What is the Radius of the earth?
- (4) A satellite is put into orbit 8km (5miles) above the earth. Assuming that the orbit is circular what distance does the satellite cover in one orbit.
- (5) If the satellite travels at 30,000 km.p.h. approximately, how long will it take to circle the earth?

- (6) A rope fits exactly around the equator.
An army of men then lift the rope one metre above the earth.
The rope is now too short.
How much more is needed?

