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College**

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This resource has been produced as a result of a grant awarded by LSIS. The grant was made available through the Skills for Life Support Programme in 2010. The resource has been developed by (managers and) practitioners. The contents should not be compared with commercially produced resources, although in many cases it may have comparable or better learning outcomes.

CALCULATING THE AREA OF A FLOWER BED AND CALCULATING NUMBER OF PLANTS NEEDED

This Skills for Life Learning resource has been developed as part of the Project Skills for Life for World Class Skills Project 2009 -2010.

This is a draft document as part of the development of the products developed for the project.

CALCULATING THE AREA OF A FLOWER BED AND CALCULATING NUMBER OF PLANTS NEEDED

In order to work out how many plants are needed for a flower bed, we need to calculate the area of it. We also need to know how far apart the plants need to be spaced and this spacing can vary according to the plants to be used.

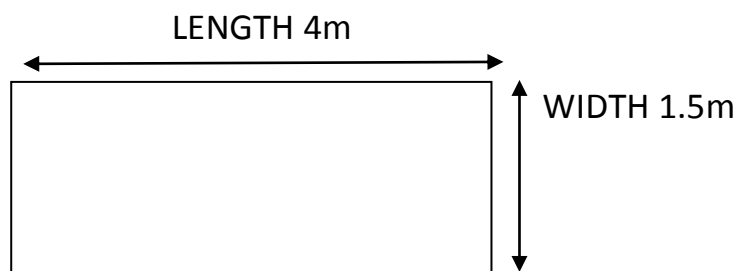
CALCULATING AREAS

The calculations needed to be done to find the area measurement, depend on the shape of the flower bed.

1. CALCULATING RECTANGULAR AND SQUARE AREAS

The length and width of the bed must be measured, these are then multiplied together to get the area measurement.

EXAMPLE



LENGTH 4 X WIDTH 1.5 = 6m² (The area measurement is shown by the sign m²)

The mathematical name for this calculation is called a **FORMULA**.

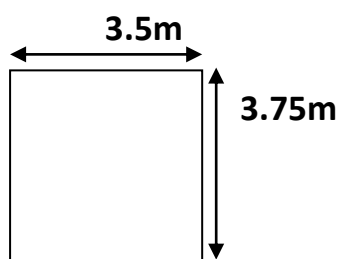
This means that the **FORMULA** to calculate an Area is Length x Width

$$A = L \times B$$

You can substitute different measurements for the length and width and this rule will apply for Squares and rectangles.

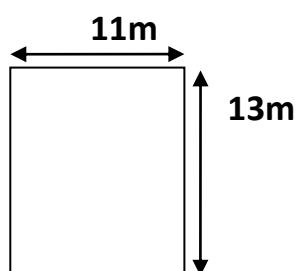
EXERCISE- Work out the AREA OF THESE FLOWER BEDS

1.



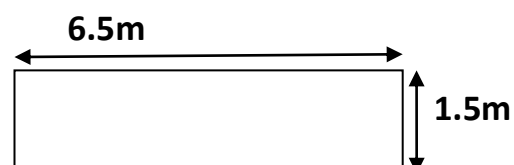
Answer 1.....

2.



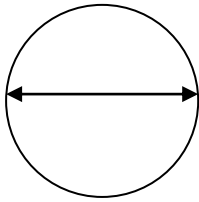
Answer 2.....

3.

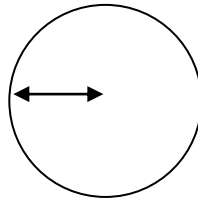


Answer 3.....

2. CALCULATING THE AREA OF CIRCLULAR FLOWER BED



DIAMETER



RADIUS

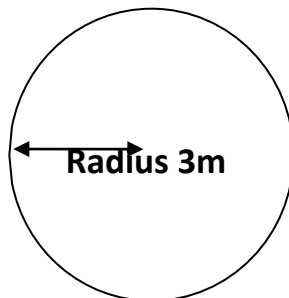
The measurement across the circle (going through the centre of the circle) is called the **DIAMETER in mathematical terms**. From the centre of the circle to the edge is called the **RADIUS. (½ the length of the Diameter)** It is the Radius measurement that we need to calculate the area of the circle along with another mathematical number that has been found to be the correct number to use when calculating the area of a circle.

This number is referred to as **PI and it's value is 3.142 (to 3 decimal places)** it is also shown in some **FORMULAS** with the following symbol π

THE FORMULA TO CALCULATE THE AREA OF A CIRCLE IS πr^2

r^2 means radius measurement x radius measurement.

EXAMPLE CALCULATION



FORMULA Area Of a Circle = πr^2

$$\text{Area} = 3.142 \times 3 \times 3$$

$$\text{Area} = 3.142 \times 9$$

$$\begin{array}{r} 3.142 \\ \times 9 \\ \hline 28.278\text{m}^2 \end{array}$$

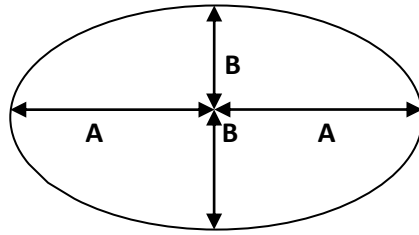
Sometimes π is only used to 2 decimal places 3.14 so the calculation would not be quite as accurate, but it would be accurate enough for garden measurements.

$$\text{Area} = 3.14 \times 3 \times 3$$

$$\text{Area} = 3.14 \times 9$$

$$\begin{array}{r} 3.14 \\ \times 9 \\ \hline 28.26\text{m}^2 \end{array}$$

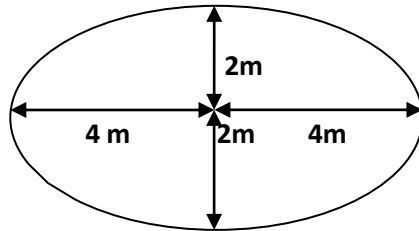
CALCULATING THE AREA OF AN OVAL FLOWER BED



The **FORMULA** to calculate the area of the oval FLOWER BED is :

AREA = π X A X B This will usually be written like this **π A B** (When there are no addition, divide or take away signs between the letters and symbols, the rule is always to multiply them together.)

EXAMPLE CALCULATION



$$\text{AREA} = 3.142 \times 4 \times 2$$

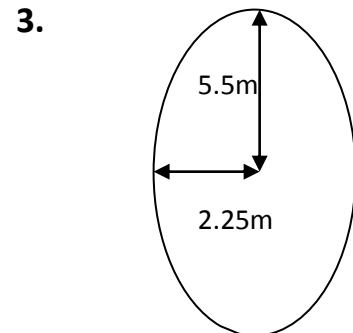
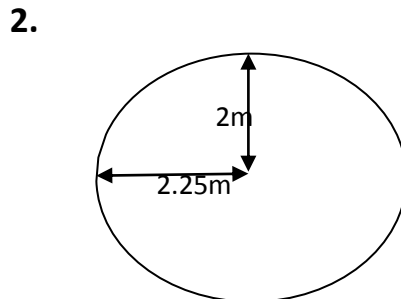
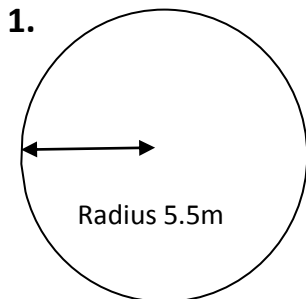
$$\text{AREA} = 3.142 \times 8$$

$$\begin{array}{r} 3.142 \\ \times 8 \\ \hline 25.136\text{m}^2 \end{array}$$

or (less accurate) 3.14

$$\begin{array}{r} 3.14 \\ \times 8 \\ \hline 25.12\text{m}^2 \end{array}$$

EXERCISE. WORK OUT THE AREA OF THESE FLOWER BEDS:



Answer 1..... Answer 2..... Answer 3.....

CALCULATING THE AREA OF A TRIANGULAR FLOWER BED

This used the **FORMULA** for a square or triangle divided by two.

Area of a triangle = $\frac{1}{2}$ base x height.

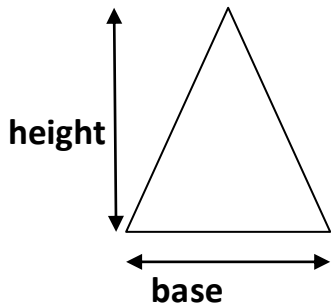


fig1

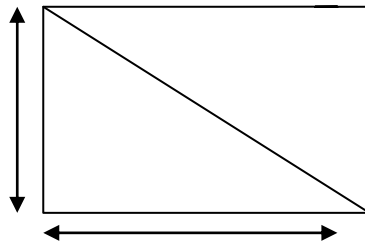


fig2

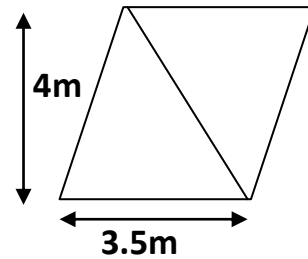


fig3

The diagrams above fig 1, 2, and 3 show that a triangle is made up of $\frac{1}{2}$ a rectangle or square.

Using fig 3 The calculation to find the area is as follows:

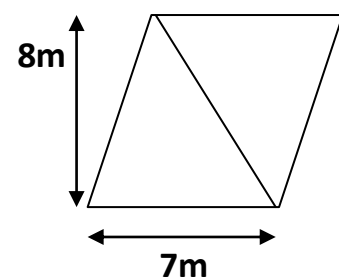
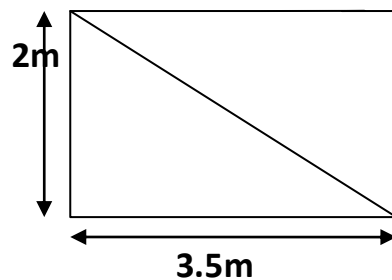
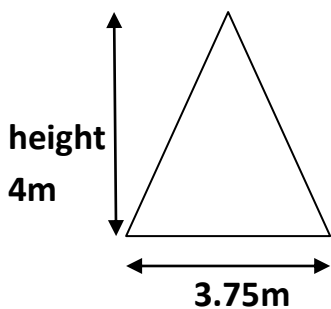
$$\text{AREA} = \frac{1}{2} \times 4 \times 3.5$$

$$\text{AREA} = \frac{1}{2} \times 14\text{m}^2$$

$$\text{AREA} = 7\text{m}^2$$

EXERCISE. CALCULATE THE AREA OF THESE FLOWER BEDS

Area of a triangle = $\frac{1}{2}$ base x height.



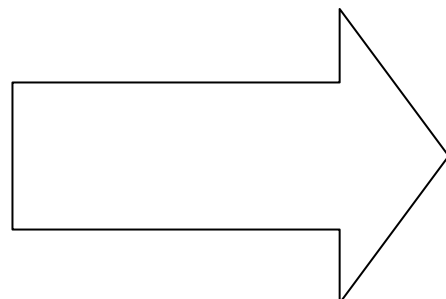
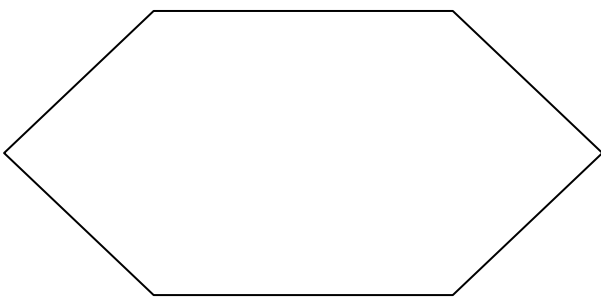
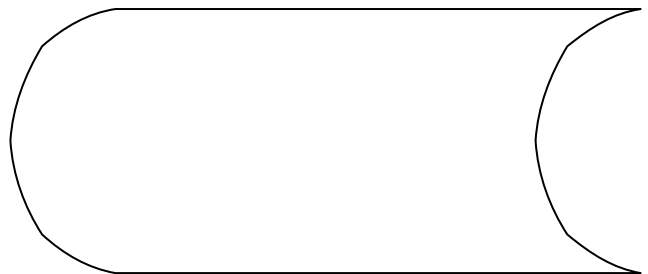
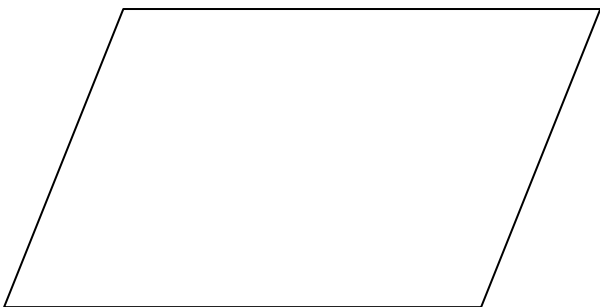
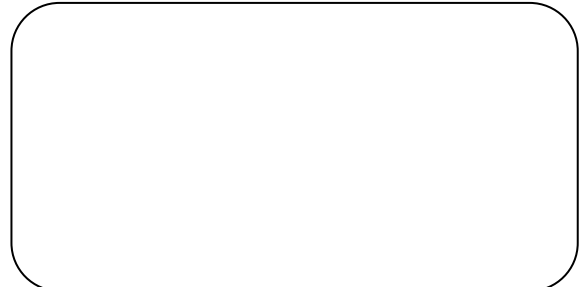
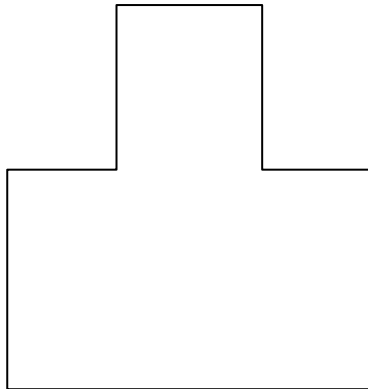
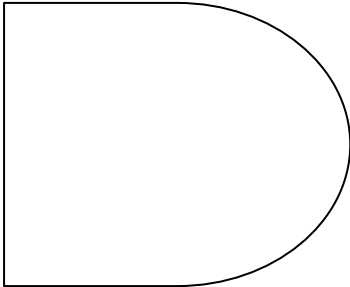
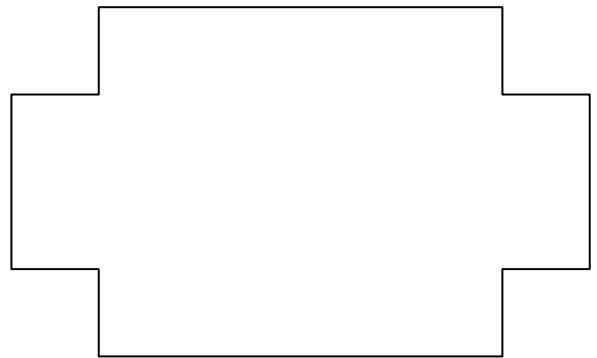
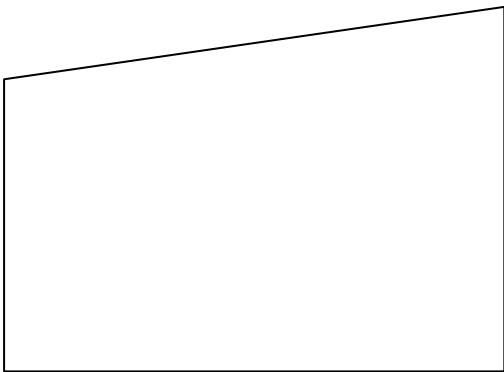
Answer 1..... Answer 2..... Answer 3.....

DIFFERENT SHAPED FLOWER BEDS

Sometimes flower beds are not a standard square, rectangle, triangle, oval or circle. But by using these shapes and dividing the areas up, we can find out the total area of the beds.

Below are some different shapes that you may find you have to plant up. Draw lines across the shapes to make up areas that could be calculated.

Needs to be printed or enter lines on to shapes

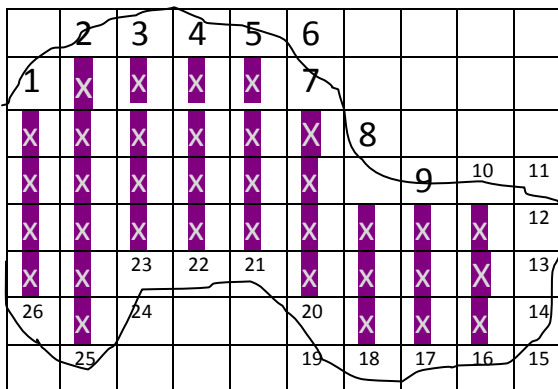


CALCULATING THE AREA OF RANDOM SHAPED FLOWER BEDS

To do this the shape of the flower bed should be drawn to scale onto graph or squared paper so that each box will represent the full sized area. The scale used will depend on how big the area is that has to be drawn.

Think of a map of the world drawn in an atlas. 1cm on the plan will represent 1000's miles for the full size it shows. A map of a town drawn on the same size of paper will be able to show much more detail and the scale will be very different. The map of a flower bed will be even more detailed and could show where each plant will be planted.

This is very useful when a flower bed is being planted up with different plants, or different coloured plants.

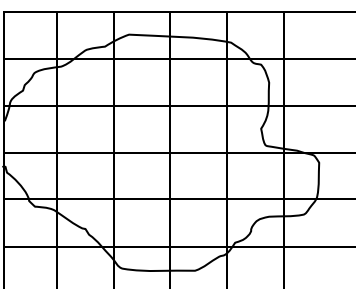


In the scale plan to the left, imagine each square represents 1 m. All the full squares **X** can be added up 35m² and then the part squares added up to give a reasonably accurate calculation for the total area. Now add up all the part squares by deciding what fraction of a whole each square is.

size	Square number							TOTAL
1/8	6	8	15					3/8
1/4	11	19	24	25				1
1/2	2	5	7	9	10	16		3
5/8	1	6	13	14	17	20	26	4 3/8
7/8	3	4	12	18	21	22	23	6 1/8
TOTAL AREA FOR PART SQUARES								15 3/8m²

Adding 35m² and 15 3/8m² gives the total area of the garden =50 3/8m². This could be rounded up to 51m² to ensure that enough plants are ordered, as the part squares have been estimated.

EXAMPLE EXERCISE



size	Square number							TOTAL
1/8								
1/4								
1/2								
5/8								
7/8								
TOTAL AREA FOR PART SQUARES								
TOTAL AREA FOR WHOLE SQUARES								
TOTAL AREA FOR GARDEN SHAPE								

USING SCALE PLANS TO DESIGN FLOWER BEDS

Designing flower beds not only involves using different plants, but also uses colour and height of plants.

Designing the planting plan on graph paper can save both time and money as you can count up the areas of each colour to decide how many plants you will need.

EXAMPLE PLAN

In this plan the garden is small and each square represents a plant, but in bigger planting schemes each square may represent 1 m².

○	○	○	○	○	○	○	○	○	○
○	X	X	X	X	X	X	X	X	○
○	X	#	#	#	#	#	#	X	○
○	X	#	○	○	○	○	#	X	○
○	X	#	○	○	○	○	#	X	○
○	X	#	#	#	#	#	#	X	○
○	X	X	X	X	X	X	X	X	○
○	○	○	○	○	○	○	○	○	○

KEY

○ RED PETUNIAS

○ YELLOW PETUNIAS

X MID BLUE LIBELIA

WHITE ALYSUM

For these bigger planting schemes it is important to know how many plants will be needed to plant up each m² and this will vary according to how much distance is needed between the plants.

USING MULTIPLICATION TABLES TO HELP CALCULATE AREA SIZES

With the help of a multiplication table it is much easier to work out areas.

The table shows numbers along one side and down one side of the grid. By tracing the numbers you want to multiply down and across the grid, it will give you the answer.

EXAMPLE - Flower bed $7\text{m} \times 8\text{m} = ?\text{m}^2$

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	56	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

The table shows that the area would be 56m^2

Use the table to work out these areas.

1. $6\text{m} \times 5\text{m}$ 2. $9\text{m} \times 10\text{m}$ 3. $3\text{m} \times 11\text{m}$ 4. $12\text{m} \times 8\text{m}$ 5. $7\text{m} \times 4\text{m}$

1. ----- 2.----- 3.----- 4.----- 5. -----

