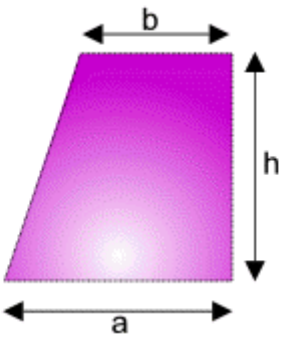
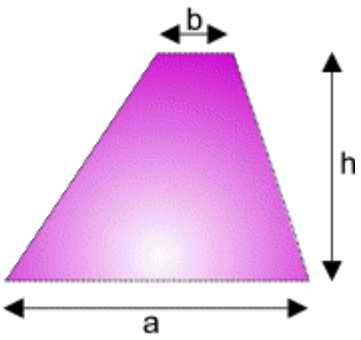
AREA OF A TRAPEZIUM

- A Trapezium has a pair of parallel sides.

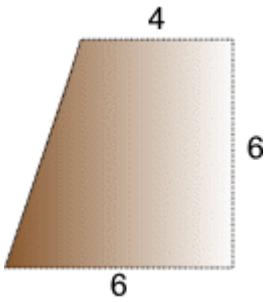
$$\text{Area} = \frac{h}{2}(a + b)$$





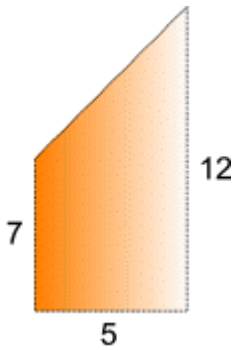
- You should be able to recognise a trapezium and find its area.

Examples



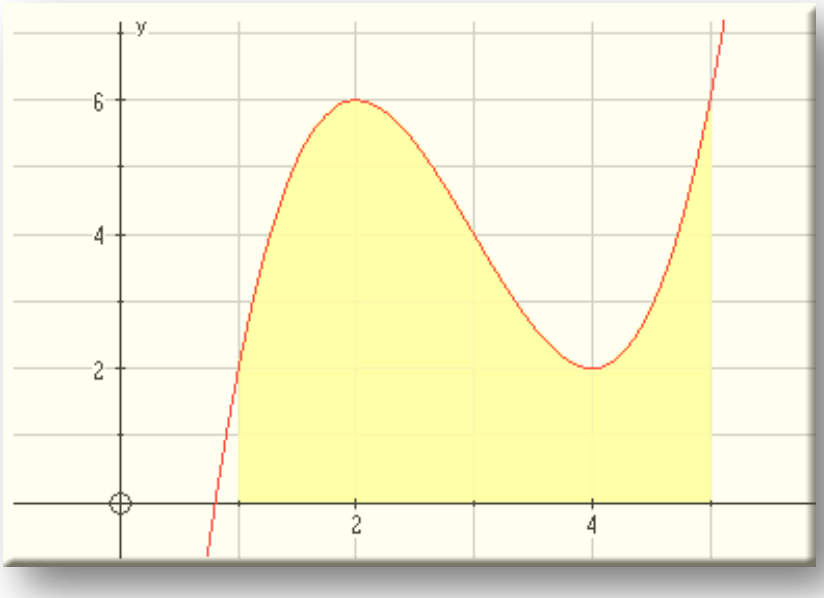
$$\text{Area} = \frac{h}{2}(a+b)$$
$$= \frac{6}{2}(6+4)$$
$$= 3 \times 10$$
$$= 30$$

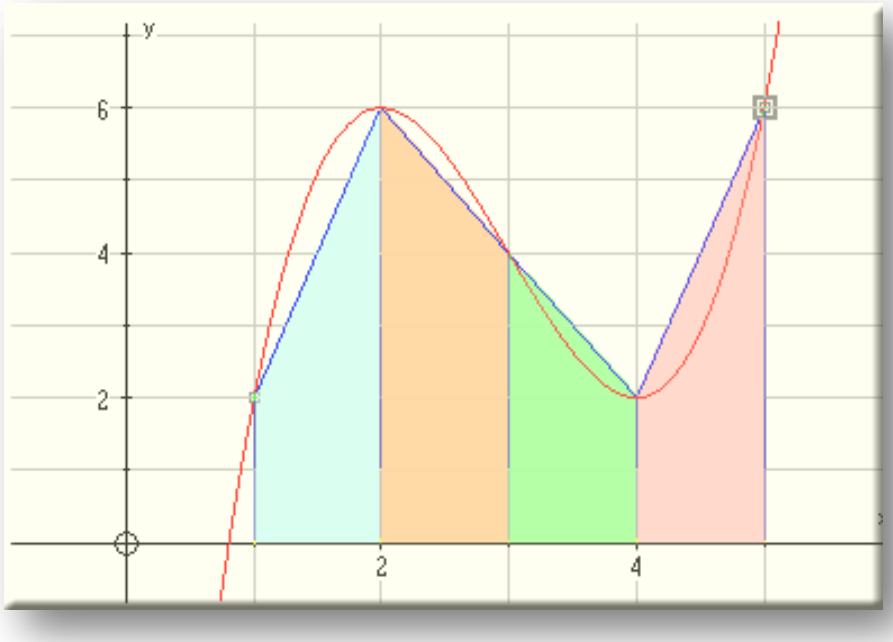
$$\text{Area} = \frac{h}{2}(a+b)$$
$$= \frac{5}{2}(7+12)$$
$$= 2.5 \times 19$$
$$= 47.5$$



AREA UNDER A CURVE

- In Maths and Science, we often need to find the area under a curve.
- This is done by
    - Drawing an accurate graph
    - Dividing the region into small equal width trapeziums
    - Finding the area of each trapezium
    - Adding all these to get an approximate value for the area under the curve.

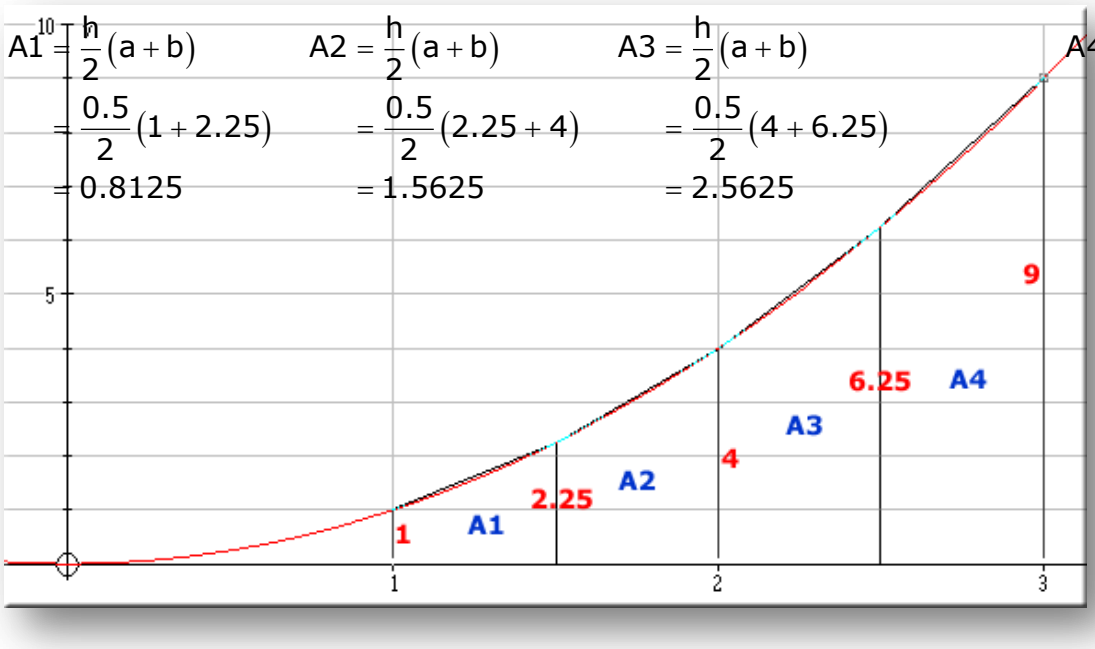




Example

Find the area under the curve of $y = x^2$ between $x = 1$ and $x = 3$.

- Accurate Graph.
- Divide into equal width trapeziums
- Find the area of each trapezium
- The lengths of the sides can be found by calculation, in this case by using $y = x^2$ or if the graph is accurate, by reading from the y-axis



$A1 = \frac{h}{2}(a+b)$ $= \frac{0.5}{2}(1+2.25)$ $= 0.8125$	$A2 = \frac{h}{2}(a+b)$ $= \frac{0.5}{2}(2.25+4)$ $= 1.5625$	$A3 = \frac{h}{2}(a+b)$ $= \frac{0.5}{2}(4+6.25)$ $= 2.5625$	$A4 = \frac{h}{2}(a+b)$ $= \frac{0.5}{2}(6.25+9)$ $= 3.8125$

Approximate area under the curve = A1 + A2 + A3 + A4 = 8.75

Smaller trapeziums will give greater accuracy.