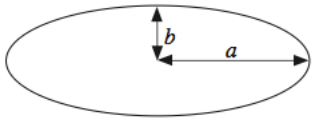
2 Formulae

2.1 Using Formulae

1. 

The area of an ellipse is given by

$$A = \pi ab$$

where a and b are given lengths (as shown).

Find the area of an ellipse when

(a) $a = 4,\ b = 2$

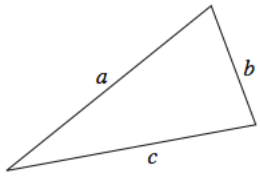
(b) $a = 2,\ b = 4$

(c) $a = b = 3$

2. The perimeter length of a triangle is given by

$$p = a + b + c$$

where a, b and c are the lengths of the three sides of the triangle.



Find the perimeter length when

(a) $a = 1,\ b = 2$ and $c = 3$

(b) $a = 4,\ b = 3$ and $c = 2$

(c) $a = b = c = 3$

If $a = 4,\ b = 3$ and $p = 11$, what is the length c?

3. Euler's formula for the vertices of a shape states that

$$v = e - f + 2$$

where e is the number of edges and f is the number of faces.

Determine v when

(a) $e = 9,\ f = 5$ (b) $e = 6,\ f = 4$

If $v = 8$ and $e = 12$, determine f.

4. Find the value of the function f where $x = 2$ and $y = 3$ and when

(a) $f = x + y$ (b) $f = 4x - 2y$

(c) $f = x^2 + y^2$ (d) $f = \dfrac{x + y}{10}$

(e) $f = \dfrac{x + 2}{y + 1}$ (f) $f = xy - 4$

(g) $f = 2x^2 - y^2$ (h) $f = \dfrac{2x + 1}{y}$

(i) $f = x^2\ y^2$ (j) $f = (x + y)^2$

5. Repeat Question 4 with $x = 3$ and $y = 4$.

6. Find the value of the functions

$$f = \sqrt[3]{xyz} \quad \text{and} \quad g = \frac{x + y + z}{3}$$

when

(a) $x = y = z = 2$ (b) $x = 1,\ y = 2,\ z = 3$ (c) $x = 2,\ y = 3,\ z = 4$

7. Here is a number machine.

Use the number machine to complete a copy of the table.

Input	2		n	
Output	11	35		x

(AQA)