Substitute positive and negative numbers into linear expressions and positive integers into simple expressions involving powers.

For example:

- Find the value of these expressions when a = 4.
  $$3a^2 + 4 \qquad 2a^3$$

- Find the value of these expressions when x = 2.5.
  $$4x + 3 \qquad 2 - 3x \qquad 7(x - 1)$$

- Find the value of y when x = ‾3.
  $$y = \frac{2x + 3}{x} \qquad y = \frac{x - 1}{x + 1}$$

- Use a short **computer program**. For example:

```
10 CLS              TO EXPRESSION :A :B
20 INPUT A          MAKE "C 6*:A—2*:B
30 INPUT B          PRINT :C
40 C = 6*A—2*B      END
50 PRINT C
60 PRINT
```

Find different ways of inputting different values for A and B to print a particular value for C.
Try different formulae.

- Use a **spreadsheet** to explore what happens when different values are substituted in an expression. For example:

	A	B	C	▼
1	−3	7	=A1*A1−B1	
2	−2	2	=A2*A2−B2	
3	−1	8	=A3*A3−B3	
4	0	−3	=A4*A4−B4	
5	1	1	=A5*A5−B5	
6	2	−4	=A6*A6−B6	
7	3	5	=A7*A7−B7	

- The number of diagonals in a polygon with n sides is given by the expression

$$\frac{n(n - 3)}{2}$$
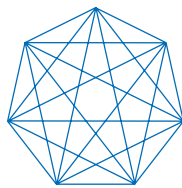
How many diagonals are there in a polygon with 20 sides?

- In this magic square, choose different values for m, p and q and substitute them.

m − p	m + p − q	m + q
m + p + q	m	m − p − q
m − q	m − p + q	m + p

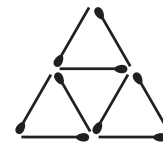What values for m, p and q will give a magic square filled with the numbers 1 to 9?

Substitute positive and negative numbers into linear expressions and expressions involving powers.

For example:

- Find the value of these expressions
  $$3x^2 + 4 \qquad 4x^3 - 2x$$
  when x = ‾3, and when x = 0.1.

- Find the values of a and b when p = 10.
  $$a = \frac{3p^3}{2} \qquad b = \frac{2p^2(p - 3)}{7p}$$

- A triangle of matches is made like this.

If the triangle has R rows, the number of matches needed is
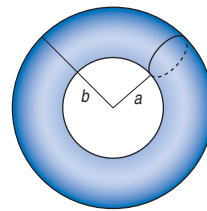
$$\tfrac{1}{2}(3R^2 + 3R)$$

How many matches are needed for a triangle with 17 rows?

- A sphere with diameter 3.6 cm is made using clay. The volume of a sphere is

$$\frac{\pi d^3}{6}, \quad \text{where d is the diameter.}$$

Work out the volume of clay in the sphere. Give your answer to a sensible degree of accuracy.

More clay is used to make this shape, a torus, with radii a = 4.5 and b = 7.5.

Its volume is $\tfrac{1}{4}\pi^2(a + b)(b - a)^2$.
Work out the volume of clay used.

- Here are two formulae.

$$P = s + t + \frac{5\sqrt{(s^2 + t^2)}}{3} \qquad A = \tfrac{1}{2}st + \frac{(s^2 + t^2)}{9}$$

Work out the values of P and A when s = 1.7 and t = 0.9.