$$x^2 - 3x + 4$$
$$3x + 6 = 8$$
$$3 = 1 + 2$$
$$3 = 4$$
$$(2x + 1) = x + (x + 1)$$

c

An equation is

1) two expressions related by an equals sign

2) two expressions separated by an equals sign

3) a statement that shows an equality relationship between two expressions (that is either true or false)

4) two expressions joined by an equals sign.

An equation is a statement of equality between two expressions.

$$3x + 6 = 8$$

The solution (only solution) is

$$x = \frac{2}{3}$$

Definition: a solution to an equation is a value for the variable(s) in it that make the equation true.

Solving an equation means finding <u>all</u> solutions.

How do we prove $x = \frac{2}{3}$ is all the solutions to $3x + 6 = 8$?

• Plug it in.

LHS $3(\frac{2}{3}) + 6 = 2 + 6 = 8$
RHS $= 8$

If $x = 2/3$
then $3x + 6 = 8$.
(So $x = 2/3$ is a solution).

• Manipulate the equation.
$$3x + 6 = 8$$
$$3x = 2$$
$$x = 2/3$$

If $3x + 6 = 8$
then $x = 2/3$

Rules of arithmetic.

• You can add or multiply two numbers and get a number as an answer.

• $x + 0 = x$, $1 \times x = x$ for all x

• Commutative property of addition ($x + y = y + x$).
  multiplication ($xy = yx$)

• Associative property of addition and multiplication $(ab)c = a(bc)$
  $(a+b) + c = a + (b+c)$

• Inverses   What number are we talking about?

• Distributive law

• Transitivity of equality

• If $a = b$ then $a + c = b + c$