

- 1.1. Linear Equations -

1.1 p1

Objectives.

- Define equation, solution.
- Classification.
- Linear Equations.
- Solving a linear eqⁿ for a specific equation.

An equation is a statement about equality of two expressions.

A solution of an equation is a nbr which satisfies the equation.

The Solution Set is the set of all the solutions of the equation.

Two equations are equivalent if they have the same solution set.

Eg! $3x + 1 = 0$ equation

$5x - 2$ is not an equation (\because no equality)

$x = -\frac{1}{3}$ is a solution of $3x + 1 = 0$

because $3\left(-\frac{1}{3}\right) + 1 = 0 \Leftrightarrow -1 + 1 = 0$
True.

$(x-2)(x+3)=0$ is an equation.

1.1 p2

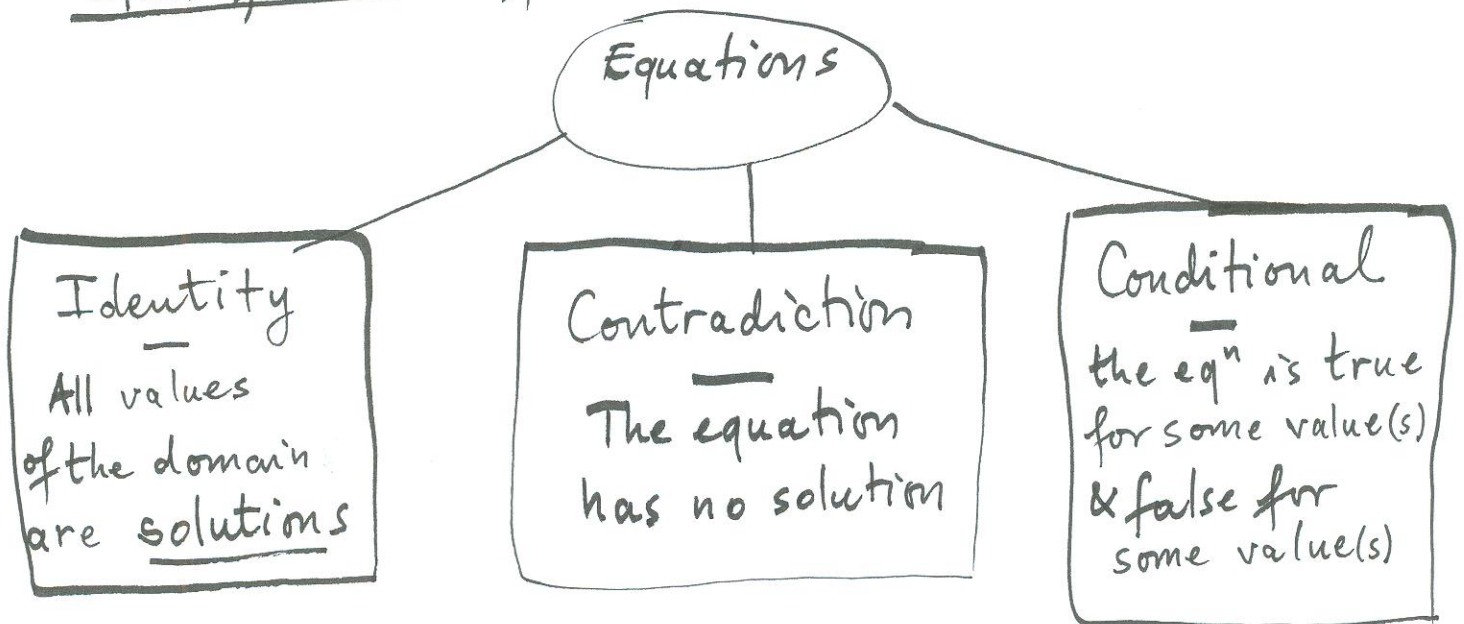
Its solution set is $\{2, -3\}$

Properties.

1) $a, b \in \mathbb{R}, \quad a = b \Leftrightarrow \begin{cases} a + c = b + c \\ a - c = b - c \end{cases}$

2) $a = b \Leftrightarrow \begin{cases} ac = bc \\ \frac{a}{c} = \frac{b}{c} \end{cases}$
 $c \neq 0$

Classification of the equations



Exp. $2(x+2) - 4 = x$ identity

$3(x-1) - 2x = x$ contradiction

$4x - 2 = 3x - 1$ conditional

A Linear Equation is an equation that can be written as

$$ax + b = 0$$

Exp 3. Solve

$$-4(3x - 5) = 3 - (8x + 5)$$

$$-12x + 20 = 3 - 8x - 5$$

$$-4x = -2 - 20 \Rightarrow x = \frac{-22}{-4} = \boxed{\frac{11}{2}}$$

Exp 4. Solve

$$i) \frac{3x+6}{10} - \frac{1}{2}x = \frac{2}{5}x + \frac{33}{5}$$

$$ii) \frac{7}{4} + \frac{1}{5}x - \frac{3}{2} = \frac{4}{5}x$$

i) Coefficients with fractions. Multiply the two sides by LCD = 10

$$\frac{3x+6}{10} - \frac{5x}{10} = \frac{4x}{10} + \frac{66}{10}$$

$$3x + 6 - 5x = 4x + 66$$

$$-6x = 66 - 6 = 60$$

$$x = \frac{60}{-6} = -10$$

Solving for a specific variable.

1.1 p 4

1) $d = rt$ for t

2) $S = kr^2 + krt$ for k

3) $11y + 8 = 2(4y + 5w) - 6z$ for y

3) look at the other variables apart from y
~~for~~ as nbers.

$$11y + 8 = 8y + 10w - 6z$$

$$11y - 8y = 10w - 6z - 8$$

$$y = \frac{10w - 6z - 8}{3}$$