

Cert HE

Applied Analytics

(Feb Intake)

5 → 6.30pm

Every Thursday.

ACMA 4009.

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Numbers

$$\mathbb{N} = 1, 2, 3, 4, 5, \dots$$

No LAST
Number
 $\rightarrow \infty$

05
50

$$-4, -3, -2, -1, '0', 1, 2, 3, 4, \dots$$

$\mathbb{Z}$ - Integers

$\mathbb{Q}$ - Rational

$$\frac{1}{2}, \frac{3}{4}, -\frac{5}{8}, \frac{5}{2}, \frac{7}{3}, \dots$$

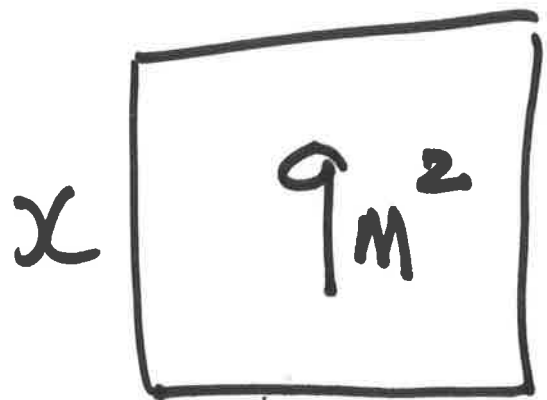
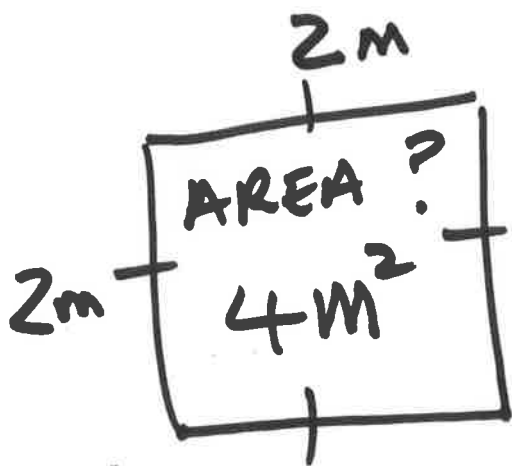
$\sqrt{2}, \pi, e \dots \dots$

Ir-Rational.

$\pi - 3.14159 - \dots$

$\mathbb{R} = \text{'Real'}$

$= 1.67, \frac{1}{4}, \sqrt{2}, -4 \dots$



$$x$$
$$3 \times 3 = 9$$

$$x^2 = 9$$

$$x = \sqrt{9}$$

$$x = 3$$

$$x \quad \boxed{-1} \quad x$$

$$x^2 = -1$$

$$x = \sqrt{-1} \leftarrow \text{Math error!}$$

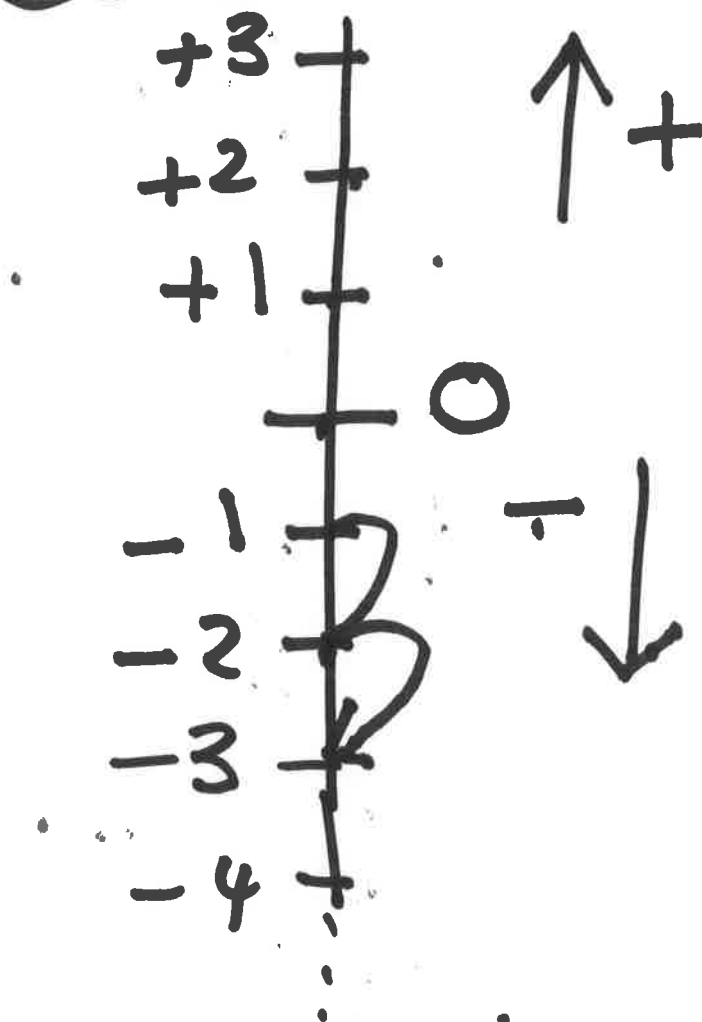
$$i^2 = -1$$

$$x = \sqrt{i^2} = i \quad (\text{Imaginary})$$

$$\underline{i \times i = -1}$$

$$\underline{\mathbb{C}} = \{ i, -i, 2+i, \dots \}$$

Directed Numbers.



$$2 - 1 = 1$$

$$-1 + 2 = +1$$

$$+2 - 4 = -2$$

$$-1 - 2 = -3$$

Rules of Signs

Multiply:

$$(+)\times(+) = +$$

$$(+2)\times(+3) = +6$$

$$(+)\times(-) = -$$

$$(+5)\times(-2) = -10$$

$$(-)\times(+) = -$$

$$(-100)\times(+2) = -200$$

$$(-)\times(-) = +$$

$$(-3)\times(-4) = +12$$

Division

$$\frac{(+)}{(+)} = +$$

$$\frac{+10}{+2} = +5$$

$$\frac{(+)}{(-)} = -$$

$$\frac{+15}{-3} = -5$$

$$\frac{(-)}{(+)} = -$$

$$\frac{-8}{+2} = -4$$

$$\frac{(-)}{(-)} = +$$

$$\frac{-20}{-4} = +5$$

EQUATIONS

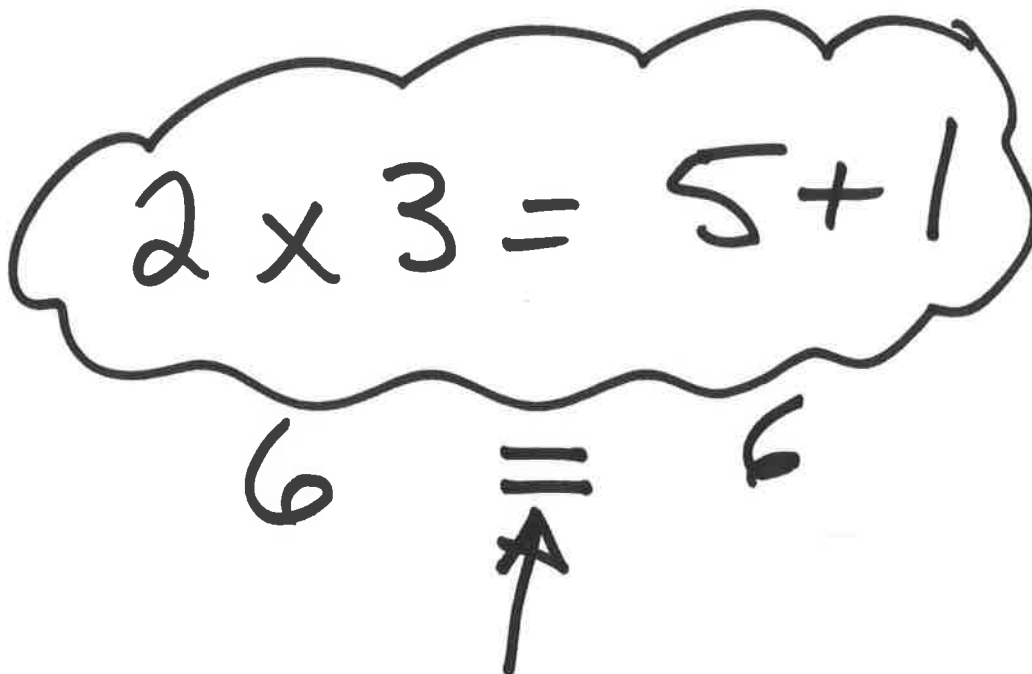
$$V = u + at$$

$$F = G \frac{m_1 m_2}{r^2}$$

$$p \propto \frac{1}{\sqrt[n]{v}} \Rightarrow p = \frac{k}{\sqrt[n]{v}}$$

$$M = 2$$

$$-\nabla p + \eta \nabla^2 \underline{v} + \rho g = \rho \frac{D}{Dt} \underline{v}$$


$$2 \times 3 = 5 + 1$$

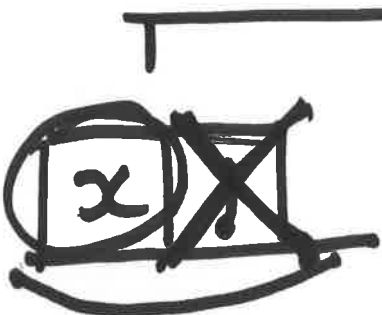
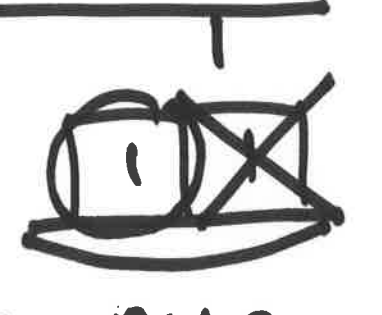
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↑

Solve 'Linear' Equation.

$$\begin{array}{l} x + 1 = 2 \\ 1 + 1 = 2 \checkmark \end{array}$$

Solution $x = 1$

 LHS	=	 RHS
x + 1 = 2		
x = 1		

$$\overset{\text{No's}}{\underline{x+1}} = \overset{\text{No's}}{\underline{2}}$$

$$\text{LHS} = \text{RHS}$$

$$\cancel{x+1-1} = 2-1$$
$$\underline{x = 1}$$

Method: (gimic)

$$x \text{ (No's)} \text{ } \overset{\text{No's}}{\text{+1}} = 2$$

$$x = 2 - 1$$

$$\underline{x = 1} \quad \checkmark$$

$$2x = 10$$

$$2 \times 5 = 10 \checkmark$$

$$\underline{\underline{x = 5}}$$

$$\frac{2x}{2} = \frac{10}{2}$$

$$\underline{\underline{1x = 5}} \checkmark$$

$$2x + 1 = 17$$

$$\begin{array}{ccc} & x's & No's \\ 2x + 1 = & 17 \end{array}$$

$$2x \quad \cancel{+1} = \cancel{1} = 17 - 1$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$\underline{x = 8}$$

check

$$LHS = 2x + 1$$

$$= 2(8) + 1$$

$$= 16 + 1$$

$$= 17 \quad \checkmark$$

$$= RHS \quad \checkmark$$

$$2x \overset{x's}{+1} \overset{No's}{=17}$$

$$2x = 17 - 1$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$\underline{x = 8}$$

$$3x \overset{x's}{+2} \overset{No's}{=17}$$

$$3x + \cancel{2} - \cancel{2} = 17 - 2$$

$$\frac{\cancel{3}x}{\cancel{3}} = \frac{15}{3}$$

$$\underline{x = 5}$$

x's

No's

$$x + 1 = -5$$

$$x \cancel{+1} \cancel{-1} = -5 - 1$$

$$x = -6$$

x's

No's

$$2x \text{ (circled)} = 19$$

$$2x = 19 + 1$$

$$\frac{2x}{2} = \frac{20}{2}$$

$$\underline{x = 10}$$

$$2x - 3 = -5$$

x's = No's

$$2x - \cancel{3} + \cancel{3} = -5 + 3$$

$$\frac{2x}{2} = \frac{-2}{+2}$$

$$\underline{x = -1}$$

Ex.

$$3x + 1 = 5$$

$$3x$$

$$= 5 - 1$$

$$\frac{3x}{3}$$

$$= \frac{4}{3}$$

$$x$$

$$= \frac{4}{3}$$

$$= 1.3 \checkmark$$

TRY

$$1/ -1 - 3 = -4$$

$$2/ (+4) \times (+3) = +12$$

$$3/ \frac{100}{-20} = +5$$

$$4/ x + 1 = -5$$

$$5/ 2x - 1 = 19$$