

Chapter 1 - Primes, HCF/LCM

Primes $\rightarrow$ Only 2 factors

Composite $\rightarrow$ More than 2 factors

Perfect Squares $\rightarrow (x)(x) = x^2$
= perfect square

Perfect Cubic $\rightarrow (x)(x)(x) = x^3$
= perfect cube

HCF = Highest Common Factor

$\rightarrow$ Take ONLY Prime factors that both/all numbers have, & ~~take~~ lowest power.

eg. $45 = 3^2 \times 5$

$105 = (3) \times (5) \times 7$

HCF = 3×5
 $= 15$

LCM = Lowest Common Multiple

$\rightarrow$ Take every prime factor (even the ones that only 1 number has) and the highest index of it.

eg. $45 = (3^2) \times (5)$

$105 = 3 \times 5 \times (7)$

LCM = $3^2 \times 5 \times 7$
 $= 315$

Prime factorization - decomposition of composite ~~factor~~ numbers into prime factors.

eg. $60 = 2 \times 5 \times 2 \times 3$

Natural Numbers $\rightarrow$ Counting Numbers

$\rightarrow 1, 2, 3, 4 \dots$

(not zero! not negative numbers)

Whole numbers $\rightarrow$ Natural no. + zero.

Integers $\rightarrow$ Every number (positive, neutral, negative) that doesn't have a decimal/fraction
 $\rightarrow -1, 0, 1, 2 \dots$

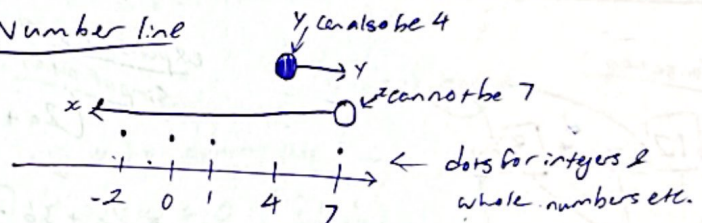
Rational Numbers $\rightarrow$ can be expressed as fraction
 $\rightarrow 1 = \frac{1}{1}, 2.25 = 2\frac{1}{4}$ etc.

* includes recurring decimals $\rightarrow 4.1111\dots$

Irrational Numbers $\rightarrow$ Cannot be expressed as fraction
 $\rightarrow \pi, \sqrt{2}$

Real Numbers $\rightarrow$ Can be represented on a number line.

Number line



$(+)(+) = (+)$ $\leftarrow$ only multiplication/division

$(+)(-) = (-)$

$(-)(-) = (+)$

* same sign

= (+) result

diff. sign

= (-) result.

$-(5)^2$ vs $(-5)^2$

$[-(5)(5)]$

$= (-25)$

$[(5)(-5)]$

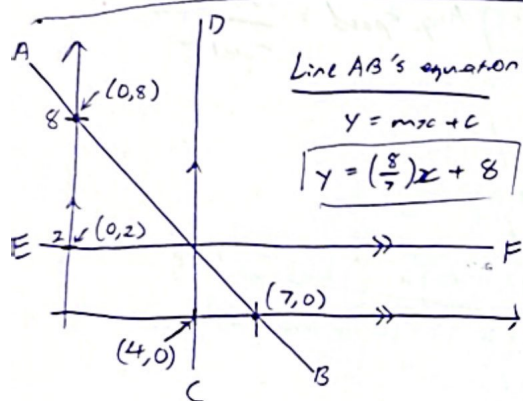
$= (25)$

→ Same as linear equations
BUT:

(Multiplication & Division only)

$6 \times (-2) > 4 \times (-2)$
 $= -12 < -8$
 (same for division)

⇒ No change in sign unless divide/multiply by negative no.



Line AB's equation

$$y = mx + c$$

$$y = \left(\frac{8}{7}\right)x + 8$$

DC → vertical line
 → gradient = Undefined ($\frac{\text{rise}}{\text{run}}$)
 → no y-intercept

$$DC \Rightarrow x = 4$$

EF → horizontal line → $x = \text{no } x$
 → gradient = 0 ($\frac{0 \text{ rise}}{\text{run}}$)
 → y-intercept = 2

$$EF \Rightarrow y = 2$$

Percentages

Percentage increase/decrease
 $= \frac{(\text{Original}) - (\text{new})}{(\text{Original})}$

Profit = Selling price - Cost price
 Percentage Profit

$$= \frac{\text{Profit}}{\text{Cost}} \times 100\%$$

$$\text{Loss} = \text{Cost price} - \text{sell price}$$

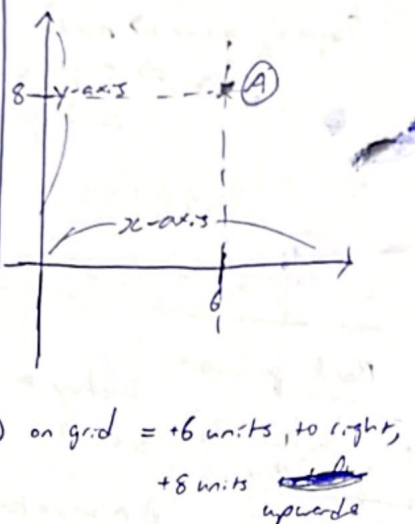
$$\% \text{ loss} = \frac{\text{loss}}{\text{Cost}} \times 100\%$$

Commission

Profit = Selling price - Cost price
 ⇒ payment for middlemen/agents

eg. factory → company → salesman
 ↓
 customer
 * Salesman = gets portion what customer paid.

Chapter 6 - Functions/Graphs



A on grid = +6 units, to right,
 +8 units upwards

Ordered pair = reading of coordinates

(x, y) → read Left-Right
 first then top-bottom.

A's coordinates are

A(6, 8)

name of point
 x y

* Gradient types

Chapter 7 - Number Patterns

General Term of sequence

⇒ formula that generates the term of the sequence.

T_n = nth Term in Sequence
 w/ variable fig. no.

Chapter 9 - Ratio, Rate, Speed

Simplify ratios $\Rightarrow$ make all whole numbers.

$\Rightarrow$ simplify the numbers if can be further broken down

eg. $15:45:50$

$\div 5 \rightarrow 3:9:10$

Bank exchange

	in	We Buy	We Sell
RM	1	3.48	

We buy = Bank takes RM

We sell = Bank takes SGD

* Always bank's perspective

Rate = comparison of two quantities of different kind.

Simple interest

$$I = \frac{PRT}{100}$$

P = Principal (deposited)

R = Rate T = Time (in year)

Hire Purchase

\$2000 - \$1400 = $\div$ months

Down payment

$\div$ %

eg. \$600

eg. 12 months (1 year)

each month

$\approx$ \$116.67

Personal Income Tax

Chargeable Income = Total income - relief - donations

Total income - relief - donation

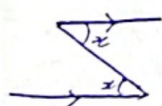
$\uparrow$ $\uparrow$
what they won't tax you
or

eg. child relief, personal relief etc.

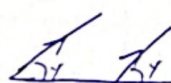
$$\text{Speed} = \frac{D}{T}$$

$$\text{Avg. Speed} = \frac{\text{Total D}}{\text{Total T}}$$

Chapter 10 - Geometry



alternate angles

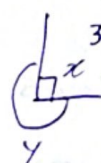


corresponding angles

$$180^\circ - x^\circ = y^\circ$$

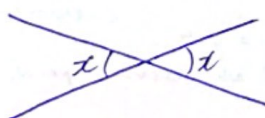


adjacent angles
on a straight line



$$360^\circ - x^\circ = y^\circ$$

angles at a point



vertically opposite angles

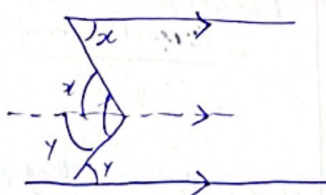


interior $\angle$ s

state which lines are parallel

angle bisector = cuts angle exactly in half

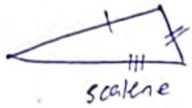
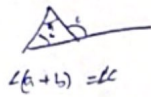
$$90^\circ = 45^\circ + 45^\circ$$



These questions:
draw an extra line!

Chapter 11

Regular polygon = all sides & angles same



scalene



isosceles



equilateral

Int. $\angle$ s of polygons

n sides

$$\hookrightarrow \frac{(n-2)(180)}{n}$$

(for 1 side)
(int. $\angle$)

$$\hookrightarrow 180^\circ - (\text{int. } \angle) = \text{ext. } \angle$$

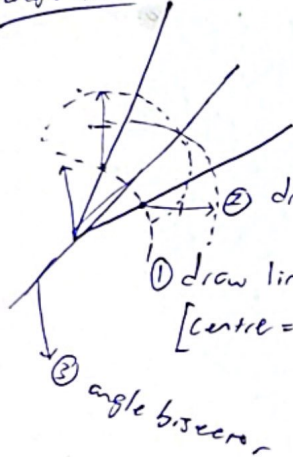
Sum of external $\angle$

$$= 360^\circ$$

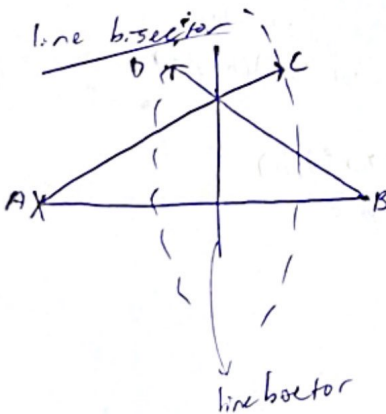
ALWAYS.

Geometrical Construction

angle bisector



① draw line (part of circle)
[centre = vertex of $\angle$]
② draw circles w/ centre as part of circle 1 and 2 lines meet.
③ angle bisector



$$AC > \text{half of } AB$$

$$AC = BD$$

Area/Perimeter (Plane Figures)

Conversion

$$1 \text{ m}^2 \rightarrow (100 \text{ cm})(100 \text{ cm}) \times 1$$



$$1 \text{ m}^2 = 100 \times 100 \times 1$$

$$= 10000 \text{ cm}^2$$

Parallelogram

$$\hookrightarrow \text{area} = (b) \times (h)$$

Trapezium

$$\hookrightarrow \text{area} = \left(\frac{a+b}{2} \right) (h)$$

Cylinder

$$\hookrightarrow \text{Volume} = (\pi r^2)(h)$$

$$\hookrightarrow \text{TSA} = 2(\pi r^2) + (\pi d)(h)$$

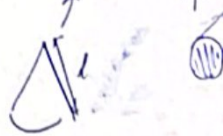
CSA = curved surface area



TSA = total surface area

Cone

$$Volume = \frac{1}{3} \pi r^2 h$$

$$TSA = \pi r l + \pi r^2$$


Chapter 14 - Statistical Data Handling

Misleading things

- Size of pictures (pie chart) → confusing proportion
 - Inconsistent scale
 - Not starting from zero (bar graph)
 - No defined scale
- } disproportionate / misleading trends & comparison

Prism

$$Vol \rightarrow (\text{Cross sectional area}) \times \text{height}$$

$$SA \rightarrow 2(\text{cross. sect. area}) + (\text{perim. of cross sect}) (\text{height})$$

→ Line graph

⇒ trend comparison

⇒ patterns

⇒ false impression when inconsistent scales.

→ Pie chart ⇒ fractional comparison
= visually appealing
percentage may not add up fully

→ Picto ⇒ visually appealing
⇒ easy to understand

(Dis-) Advantages of each type of graph

→ FDT ⇒ organization, accuracy ; less appealing

→ Bar ⇒ visually appealing ; fractional quantity
⇒ comparison
⇒ many categories
false impression risks

→ Picto ⇒ visually appealing ; must have consistent size of picture
⇒ easy to understand

Summary

$$I = \frac{PRT}{100}$$

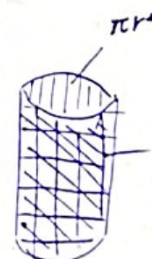
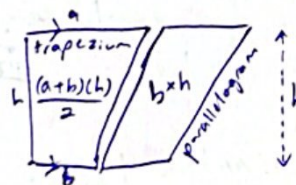
Interest

$$y = mx + c$$

equation of line

Gradient (m)

$$= \frac{\text{rise}}{\text{run}}$$



perimeter of circle $\times$ height
→ $(2\pi r)(\text{height})$

$$Vol = (\pi r^2)(h)$$