MATHEMATICAL FORMULA BOOK

ENGAGE. INSPIRE. THRIVE

CONTACT ME ON: 0776 383249/ 0755 485726
Email: nsubugaregan163@gmail.
WHATSAPP NO. 0776 383249.



UPPER PRIMARY PUPIL'S BOOK.

SECOND EDITION

MATHEMATICAL FORMULA WITH EXAMPLES.

1) Subsets = 2^n

For example;

Given that set A = {a, b, c}, find the number of subsets set A has.

Subsets = 2^n

n = 3

= 2^3

= (2×2) ×2

= 4 × 2

= 8 subsets.

2) Proper Subsets = 2^n-1

For example;

Given that set P = {a, b, c, d}, how many proper subsets does set P has?

Proper subsets = 2^n-1

n = 4

= 2^4-1

= (2×2) × (2×2)-1

= (4 × 4) - 1

= 16 - 1

= 15 proper subsets.

3) Triangular number = $n\frac{(n+1)}{2}$

n means number.

For example;

What is the 6th triangular number?

Triangular number = $n\frac{(n+1)}{2}$

= $6\frac{(6+1)}{2}$

= $\frac{6 \times 7}{2}$

= $\frac{42}{2}$

= 21.

4) Square number = n^2

Where n stands for number.

For example;

Find the square of 4.

= 4^2

= 4 × 4

= 16.

5) Cube number = n^3
Where n stands for number
For example;
What is the cube of 5?
= 5^3
= 5 × 5 × 5
= 125.

6) Increase = New – Old.
For example;
The number of pupils in P.6 class increased from 100 to 150 this year. Calculate the increased number.
Increase = New – old
= 150 – 100
= 50.

- % Increase = $\frac{\text{increase}}{\text{Original no.}} \times 100\%$

For example;
The number of pupils increased from 400 to 420 in a school this year. Calculate the percentage increase.
% increase = $\frac{\text{increase}}{\text{Original no.}} \times 100\%$
= $\frac{420 - 400}{350} \times 100\%$
= $\frac{\cancel{20}}{\cancel{400}} \times 1\cancel{00}\%$
= 5 × 1%
= 5%.

7) Decrease = Old – New
For example;
When 480 was decreased, it became 420. Calculate the decrease.
Decrease = Old – New
= 480 – 420
= 60.

- % decrease = $\frac{\text{decrease}}{\text{Original no.}} \times 100\%$

For example;
By what percentage will 100 be decreased to become 80?
% decrease = $\frac{\text{decrease}}{\text{Original no.}} \times 100\%$
= $\frac{100 - 80}{100} \times 100\%$
= $\frac{20}{\cancel{100}} \times \cancel{100}\%$
= 20 × 1%
= 20%

8) Profit = Selling Price (S.P) – Buying Price (B.P)

For example;

Kevin bought a television set at sh. 800,000 and sold it later at sh. 900,000. Calculate his profit.

Profit = S.P - B.P

= sh. 900,000 – sh. 800,000

= sh. 100,000.

- % Profit = $\frac{\text{Profit}}{\text{Cost price (C.P)}} \times 100\%$

For example;

Find the percentage profit on a chair bought at sh. 10,000 and sold at sh. 12,000.

% Profit = $\frac{\text{Profit}}{\text{C.P}} \times 100\%$

= $\frac{12,000 - 10,000}{10,000} \times 100\%$

= $\frac{2,000}{10,000} \times 100\%$

= 2 × 10%

= 20%

9) Loss = Buying Price (B.P) – Selling Price (S.P)

For example;

Isaac bought a radio at sh. 60,000 and sold it at sh. 40,000. Calculate his loss.

Loss = B.P – S.P

= sh. 60,000 – sh. 40,000

= sh. 20,000

- % Loss = $\frac{\text{Loss}}{\text{C.P}} \times 100\%$

For example;

Sophia bought a car at sh. 8,000,000 and sold it at sh. 6,000,000. Calculate her percentage loss.

% Loss = $\frac{\text{Loss}}{\text{C.P}} \times 100\%$

= sh. $\frac{8,000,000 - sh.\ 6,000,000}{Sh.8,000,000} \times 100\%$

= sh. $\frac{2,000,000}{Sh.\ 8,000,000} \times \frac{100}{4}\%^{25}$

= 1 × 25%

= 25%

10) Discount = Marked Price (M.P) – Cash Price (C.P)

For example;

The marked price of a radio is sh. 40,000. After a discount Bashir paid sh. 35,000 cash. How much was the discount?

Discount = M.P – C.P

= sh. 40,000 – sh. 35,000

= sh. 5,000

- % discount = $\frac{\text{Discount}}{\text{M.P}} \times 100\%$

For example;

The marked price of a set is sh. 1,500. Milly paid sh. 1,200 after being given a discount. What was the percentage discount?

% discount = $\frac{\text{Discount}}{\text{M.P}} \times 100\%$

= $\frac{1,500 - 1,200}{1,500} \times 100\%$

= $\frac{\cancel{300}^{\,1}}{\cancel{1500}_{\,5}} \times \cancel{100}\%^{\,20}$

= 20% discount

11) Simple Interest (S.I) = Principal (P) × Rate (R) × Time (T)

For example;

Calculate the simple interest on sh. 40,000 kept for 3 years at a rate of 30% per year.

Simple interest = P × R × T

= sh. 40,0$\cancel{00}$ × $\frac{30}{1\cancel{00}}$ × 3

= sh. 400 × 30 × 3

= sh. 12,000 × 3

= sh. 36,000

12) Amount = Principal (P) + Interest (I)

For example;

Calculate the amount on sh. 40,000 borrowed for 2 years at 10% per year.

Interest = P × R × T

= sh. 40,0$\cancel{00}$ × $\frac{10}{1\cancel{00}}$ × 2

= sh. 400 × 10 × 2

= sh. 8,000

Amount = Principal + Interest

= Sh. 40,000 + sh. 8,000

= sh. 48,000

13) Rate = $\frac{S.I \times 100}{P \times T}$

For example;

Sarah deposited sh. 60,000 on her savings account. At the end of 2 years the simple interest earned was sh. 12,000. Calculate the rate of interest.

Rate = $\frac{S.I \times 100}{P \times T}$

= $\frac{\cancel{sh.}\,^{6}\cancel{12,000} \times {}^{5}\cancel{100}}{\cancel{Sh.60,000} \times \cancel{2}}$

= 6 × 5

= 30%

14) Principal = $\frac{S.I \times 100}{R \times T}$

For example;

What sum of money will yield an interest of Sh. 5,000 at a rate of 2% for 4 years?

Principal = $\frac{S.I \times 100}{R \times T}$

= sh. $\frac{\cancel{5,000}^{2500} \times \cancel{100}^{25}}{\cancel{2} \times \cancel{4}}$

= sh. 2500 × 25

= sh. 65,500

15) Time = $\frac{S.I \times 100}{P \times R}$

For example;

In what time will sh. 15,000 yield an interest of sh. 1,200 at 4% per year?

Time = $\frac{S.I \times 100}{P \times R}$

= $\frac{^{30}\cancel{1,200} \times 1\cancel{00}}{15,\cancel{000} \times \cancel{4}}$

= $\frac{\cancel{30}^{2}}{\cancel{15}}$

= 2 years

16) Range = Highest (H) – Lowest (L)

For example;

Given the following marks scored by Mark in Mathematics papers;
70, 65, 40, 60, 20. Find his range.

Range = H – L

= 70 – 20

= 50.

17) Mean = $\frac{\text{Total items}}{\text{No. of items}}$

For example;

Joyce scored the following marks in her test; 50, 40, 70, 60. Calculate her mean.

Mean = $\frac{\text{Total marks}}{\text{No. of tests}}$

$= \frac{50 + 40 + 70 + 60}{4}$

$= \frac{\cancel{220}^{55}}{\cancel{4}}$

$= \underline{\underline{55}}$.

18) Probability = $\frac{\text{All expected outcomes (E)}}{\text{All possible outcomes (T)}}$

For example;

In a box, there are 7 red pens, 4 blue pens and 3 black ones. What would be the probability of choosing a blue pen?

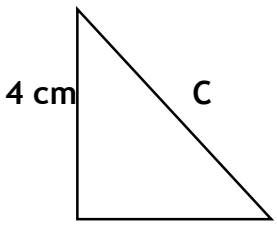
Probability = $\frac{n(E)}{n(T)}$

$= \frac{4}{7 + 4 + 3}$

$= \underline{\underline{\frac{4}{14}}}$

19) Pythagoras Theorem: $a^2 + b^2 = c^2$

For example;



$a^2 + b^2 = C^2$

$3^2 + 4^2 = C^2$

$9 + 16 = C^2$

$\sqrt{25} = \sqrt{C^2}$

$C = \underline{\underline{5}}$

20) Number of sides of a polygon = $\frac{\text{All exterior angles}}{\text{Each exterior angle}}$ which is;

$= \frac{360^0}{\text{Ext angle}}$

For example;

Calculate the number of sides of a regular polygon whose exterior angle is 30^0.

Number of sides = $\frac{360^0}{\text{Ext angle}}$

$= \frac{^{12}\cancel{360^0}}{\cancel{30^0}}$

$= \underline{\underline{12 \text{ sides.}}}$

21) Number of Triangles in a given polygon = (n - 2)
n stands for number of sides a given polygon has.
For example;
How many triangles can be formed from a Hexagon?
Number of triangles = n-2
= 6-2
= 4 triangles.

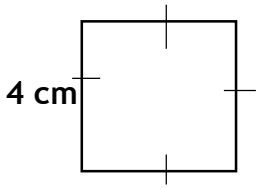
22) Number of right angles of a polygon = 2(n - 2) or 2n – 4.
For example;
Calculate the number of right angles in a polygon with 7 sides.
Number of right angles = 2n - 4
= (2 × 7) - 4
= 14 - 4
= 10 right angles.

23) Interior angle sum of a polygon = Int. angle × no. of triangle.
$= 180^0 \times (n - 2) / 180^0(n - 2)$ or
$= 90^0(2n - 4)$.

For example;
Calculate the interior angle sum of a polygon of 8 sides.
Angle sum = $180^0(n-2)$
= $180^0(8-2)$
= $180^0 \times 6$
= 1080^0

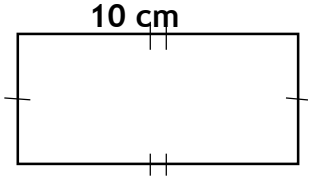
24) AREA OF;

i. Square = S × S or (S^2) or L × L or (L^2)
For example;
Find the area of the square whose side is 4 cm.



Area = S × S
= 4 cm × 4 cm
= 16 cm^2

ii. Rectangle = L × W or (lw)
For example;
Find the area of the rectangle with length of 10 cm and 8 cm width.

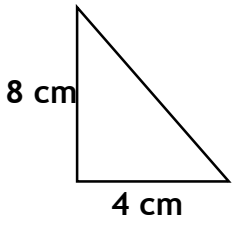


Area = L × W
= 10 cm × 8 cm
= 80 cm^2

iii. Triangle = $\frac{1}{2}$× base × height or ($\frac{bh}{2}$)

For example;

Find the area of triangle below.



Area = ½ × b × h

= $\frac{b \times h}{2}$

= $\frac{4\ cm \times {}^{4}\cancel{8}\ cm}{\cancel{2}}$

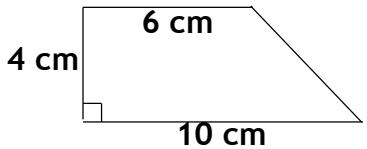
= 4 × 4 cm^2

= 16 cm^2

iv. Trapezium = $\frac{1}{2}$ × h × (a+b)

For example;

Find the area of the trapezium below.



Area = ½h (a + b)

= ½ × 4 cm × (6 cm + 10 cm)

= $\cancel{\frac{1}{2}}$ × 4 cm × ${}^{4}\cancel{16}$ cm

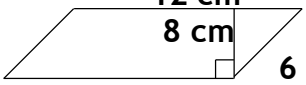
= 4 cm × 4 cm

= 16 cm^2

v. Parallelogram = Base (B) × Height (H) (= b × h)

For example;

Calculate the area of the parallelogram below.



Area = b × h

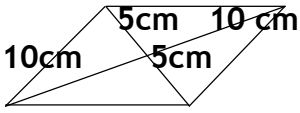
= 12 cm × 8 cm

= 96 cm^2

vi. Rhombus and Kite = $\frac{1}{2}$ × d_1 × d_2

For example;

Find the area of the rhombus below.



Area = ½ × d_1 × d_2

= $\cancel{\frac{1}{2}}$ × ${}^{10}\cancel{20}$ cm × 10cm

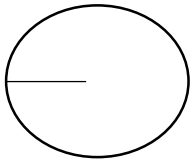
= 10 cm × 10 cm

= 100 cm^2

vii. Circle = πr^2

For example;

Find the area of a circle whose radius is 14 cm.



Area = πr^2

= $\frac{22}{\cancel{7}_1}$ × ${}^{2}\cancel{14}$ cm × 14 cm

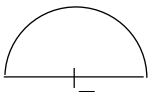
= 22 × 7 cm × 14 cm

= 616 cm^2

viii. Semi-Circle = $\frac{1}{2}\pi r^2$

For example;

Calculate the area of a semi-circle of radius 7 cm.



7 cm

Area = $\frac{1}{2}\pi r^2$

= $\frac{1}{2}$ × $\frac{11}{7}\frac{22}{}$ × $\frac{1}{7}$ cm × 7 cm

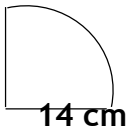
= 11 × 7 cm²

= 77 cm²

ix. Quadrant = $\frac{1}{4}\pi r^2$

For example;

Find the area of a quadrant of a circle with radius 14 cm.



14 cm

Area = $\frac{1}{4}\pi r^2$

= $\frac{1}{4_1}$ × $\frac{11}{7_1}\frac{22}{}$ × $\frac{2}{14}$ cm × $\frac{7}{14}$ cm

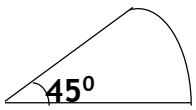
= 11 × 2 cm × 7 cm

= 154 cm²

x. Sector = $\frac{\text{given angle}}{360^0}\ \pi r^2$

For example;

Calculate the area of a sector of a circle of radius 28 cm and the center angle 45^0



45^0

28 cm

Area = $\frac{45^0}{360^0_8}\pi r^2$

= $\frac{1}{8}\ \pi r^2$

= $\frac{1}{8_4}$ × $\frac{11}{7}\frac{22}{}$ × $\frac{28}{}^4$ cm × 28 cm

= 11 × 28 cm²

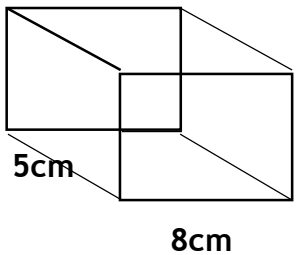
= 308 cm²

25) TOTAL SURFACE AREA (T.S.A) OF;

a. Cuboid = (2lw) + (2lh) + (2wh) or
2(LW + LH + WH)

For example;

Find the total surface area of a cuboid whose sides measure 8cm by 5cm by 6cm.



6cm

5cm

8cm

T.S.A =2((L×W) + (L×H) + (W×H))

= 2((8cm×5cm) + (8cm×6cm) + (5cm×6cm))

= 2((40cm²) + (48cm²) + (30cm²))

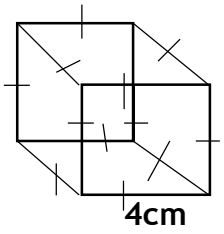
= 2 × 118cm²

= 236cm².

b. Cube = $6(S \times S)$ or $6 \times L^2$

For example;

Calculate the total surface area of a cube whose sides' measures 4cm.

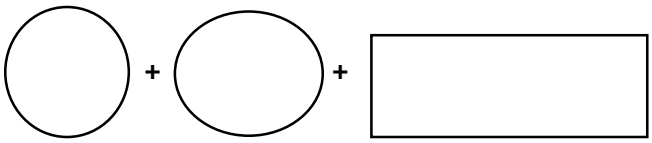


T.S.A = $6 \times L^2$
= $6 \times 4cm \times 4cm$
= $6 \times 16cm^2$
= $\underline{96cm^2}$

c. Cylinder = $2\pi r^2 + 2\pi rh$ (when closed)

For example;

Calculate the total surface area of a cylinder whose radius is 7cm and height 10cm (Use π= 22/7)



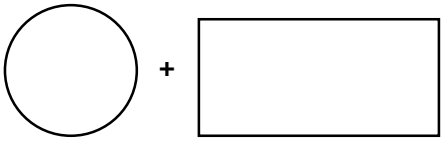
T.S.A = $2\pi r^2 + 2\pi rh$
= $(2 \times \frac{22}{\cancel{7}} \times 7 \times \cancel{7}) + (2 \times \frac{22}{\cancel{7}} \times \cancel{7} \times 10)$
= $(44 \times 7) + (44 \times 10)$
= $44(7+10)$
= 44×17
= $\underline{748cm^2}$

d. Cylinder = $\pi r^2 + 2\pi rh$ (when one side is open)

For example;

Calculate the total surface area of an open cylinder whose radius is 7cm and height 8cm (Use π= 22/7)

Note: An open cylinder has one circular end.

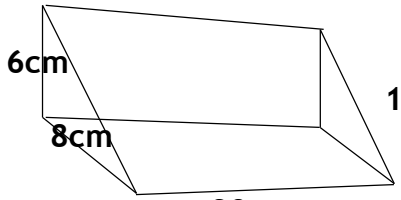


T.S.A = $\pi r^2 + 2\pi rh$
= $(\frac{22}{\cancel{7}} \times 7 \times \cancel{7}) + (2 \times \frac{22}{\cancel{7}} \times \cancel{7} \times 8)$
= $(22 \times 7) + (44 \times 8)$
= $154 + 352$
= $\underline{506cm^2}$

e. Triangular prism = (b × h) + (L ×W) + (L × W) + (L × W)

For example;

Find the surface area of the triangular prism below.



T.S.A = (b × h) + (L × W) + (L × W) + (L × W)

= (8 × 6) cm2 + (20 × 8) cm2 + (20 × 6) cm2 + (20 × 10) cm2

= 48 cm^2 + 160 cm^2 + 120 cm^2 + 200 cm^2

= 528 cm^2

26) PERIMETER OF;

i. Square = S+S+S+S or 4S

For example;

Find the perimeter of the square whose sides are 4cm



Perimeter = 4 × S

= 4 × 4cm

= 16cm

ii. Rectangle = L+W+L+W or 2(L+W) or 2L+2W

For example;

Find the perimeter of the rectangle below.



Perimeter = 2(L + W)

= 2(10 + 6) cm

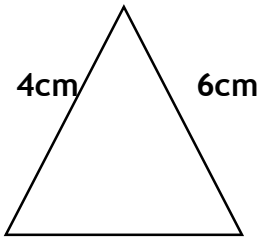
= 2 × 16 cm

= 32 cm

iii. Triangle = S_1+S_2+S_3

For example;

Find the perimeter of triangle below.



Perimeter = S + S + s

= (12 cm + 6 cm) + 4 cm

= 18 cm + 6 cm

= 24 cm.

27) CIRCLES

i. Diameter = 2×radius (2r)

For example;

Find the diameter of a circle whose radius is 20cm.

Diameter = 2 × radius

= 2 × 20cm

= 40cm.

ii. Radius = $\frac{\text{Diameter}}{2}$ (D)

For example;

Find the radius of a circle whose diameter is 20cm

Radius = $\frac{\text{Diameter}}{2}$

= $\frac{^{10}\cancel{20}}{\cancel{2}}$cm

= 10cm.

28) CIRCUMFERENCE OF;

i. Circle = πd (When diameter is given)

= 2πr (When radius is given)

For example;

Calculate the circumference of a circle whose diameter is 21cm (Use π = 22/7)

Circumference = πd

= $\frac{22}{\cancel{7}}$ × $^{3}\cancel{21}$ cm

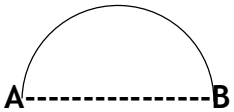
= 22 × 3 cm

= 66 cm.

ii. Length of Semi-circle (arc) = $\frac{1}{2}$πd

For example;

Find the length of the semicircular arc AB



14 cm

Length AB = ½πd

= $\frac{\cancel{1}}{\cancel{2}}$ × $^{11}\frac{\cancel{22}}{\cancel{7}}$× $^{2}\cancel{14}$

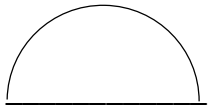
= 11 × 2

= 22cm

iii. Perimeter of Semi-circle = $\frac{1}{2}\pi d+d$

For example;

Find the perimeter of the semicircular region AB.



Perimeter = ½πd + d

= $(\frac{1}{2} \times {}^{11}\frac{22}{7} \times {}^{2}\frac{14}{1})$ +14

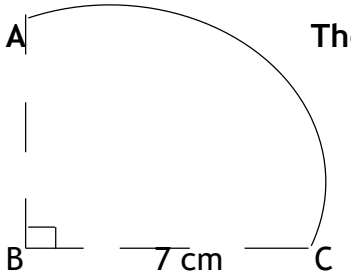
= (22 + 14) cm

= 36 cm

iv. Length of Quadrant = $\frac{1}{4}$ 2πr

For example;

Find the length of AC of the quadrant drawn below.



The curved length = ¼ (2πr)

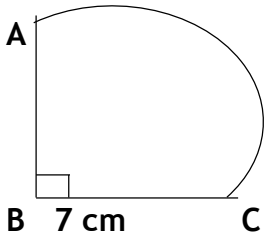
= $\frac{1}{4} \times \frac{2}{1} \times {}^{11}\frac{22}{7} \times \frac{7}{1}$

= 11 cm.

v. Perimeter of Quadrant = $(\frac{1}{4}2\pi r) + r + r$

For example;

Find the perimeter of the figure.



Perimeter = ¼(2πr) + r + r

= $(\frac{1}{4} \times \frac{2}{1} \times {}^{11}\frac{22}{7} \times \frac{7}{1}) + 7 + 7$

= 11 + 7 + 7

= 25 cm

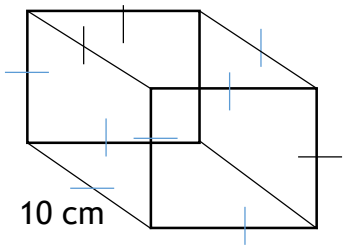
29) VOLUME OF;

a. Cube = (Base area × height)

= S×S×S

For example;

Find the volume of the cube below.



Volume = s × s × s

= (10 cm × 10 cm) × 10 cm

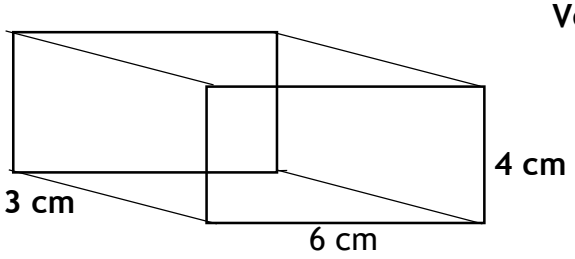
= 100 cm^2 × 10 cm

= 1000 cm^3

b. Cuboid = Base area × height
= L×W×H

For example;

Find the volume of the cuboid below

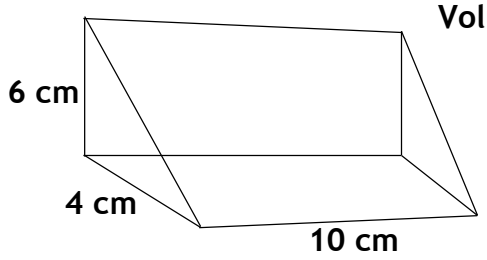


Volume = L×W×H
= (6 cm×3 cm) ×4 cm
= 18 cm^2 × 4 cm
= 72 cm^3

c. Triangular Prism = (Area of triangle × length)
= $\frac{1}{2}$b×h×l

For example;

Find the volume of the figure below.

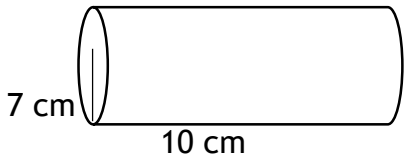


Volume = (½ × b × h) × l
= (~~½~~ × ~~4~~^{2} cm × 6 cm) × 10 cm
= (2 cm × 6 cm) × 10 cm
= 12 cm^2 × 10 cm
= 120 cm^3

d. Cylinder = (Area of circle × height)
= (πr^2) h

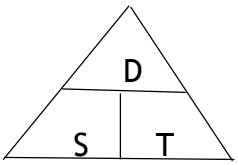
For example;

Find the volume of the cylinder below.



Volume = (πr^2) × h
= ($\frac{22}{~~7~~}$ × ~~7~~ cm × 7cm) × 10 cm
= (22 cm × 7 cm) × 10 cm
= 154 cm^2 × 10 cm
= 1540 cm^3

i) Distance (D) = Speed (S) × Time (T)



For example;

James took 4 hours to cover a distance at a speed of 30 km hr. What distance did it cover?

Distance = speed × time

$= \frac{30km}{1hr} \times \frac{4hrs}{}$

= 120km

ii) Speed (S) = $\frac{\text{Distance (D)}}{\text{Time (T)}}$

For example;

Tom took 2 hours to cover a distance of 36 km on his bicycle. At what speed was she riding.

Speed = $\frac{\text{Distance}}{\text{Time}}$

= $\frac{^{1}36km}{_{1}2hrs}$

= 18km/hr.

iii) Time (T) = $\frac{\text{Distance (D)}}{\text{Speed (S)}}$

For example;

How long will a car take to cover a distance of 120km at a speed of 40kmhr?

Time = $\frac{\text{Distance}}{\text{Speed}}$

$= \frac{^{3}120km}{_{1}40km} \times 1hr$

= 3hrs.

iv) Duration (D) = Ending Time (E.T) – Starting Time (S.T)

For example;

A plane left Entebbe at 1:00pm and arrived in Cairo at 5:30pm. How long did the flight take?

Duration = E.T – S.T

= 5:30pm – 1:00pm

= 4hrs 30min or 4½hrs

S/W	
hrs.	Min.
5	30
- 1	00
4 hrs.	30min

v) Ending Time (E.T) = Starting Time (S.T) + Duration (D)

For example;

A party started at 1:00pm and it lasted for 4hrs 30mins. At what time did it end?

Ending time = S.T +D
=1:00pm + 4hrs 30mins
= 5:30pm

P.O.W
1 00
+ 4 30
5 30pm

vi) Starting Time (S.T) = Ending Time (E.T) – Duration (D)

For example;

A party ended at 5:30pm and it lasted for 4hrs 30mins. At what time did it start?

Starting time = E.T- D
= 5:30pm – 4hrs 30mins
= 1:00pm

P.O.W
5 30
- 4 30
1 00pm

CONVERSION OF METRIC UNITS

King Henry's Daughter Mary Drank Cold Milk.

Kilometer (Km)	Hectometer (hm)	Decameter (Dm)	Meter (M)	Decimeter (dm)	Centimeter (cm)	Millimeter (mm)	Length (distance)
Kilogram (Kg)	Hectogram (Hg)	Decagram (Dg)	Gram (G)	Decigram (dg)	Centigram (Cg)	Milligram (mg)	Mass (weighing)
Kiloliter (Kl)	Hectoliter (Hl)	Decaliter (Dl)	Liter (L)	Deciliter (dl)	Centiliter (Cl)	Milliliter (ml)	Capacity

Where by >>> 1 km = 1000 m
1 kg = 1000 g
1 kl = 1000 l
1 l = 1000 ml

For example;

Change 5km to meter.

Km Hm Dm M dm cm mm
1 0 0 0

1km =1000m
5km = (5 × 1000) m
= 5000m

Change 2liters to milliliter.

Kl Hl Dl L dl cl ml
1 0 0 0

1liter =1000ml
2l = (2 × 1000) ml
= 2000 ml

Express 24kg as grams

Kg Hg Dg G dg cg mg
1 0 0 0

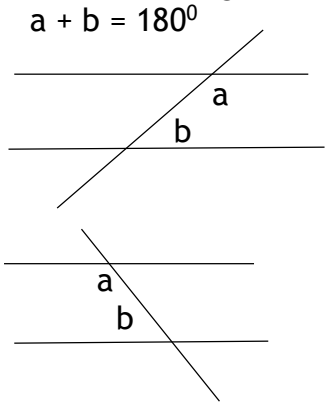
1kg=1000g
34kg = (34×1000) g
=34000grams

ANGLES ON PARALLEL LINES.

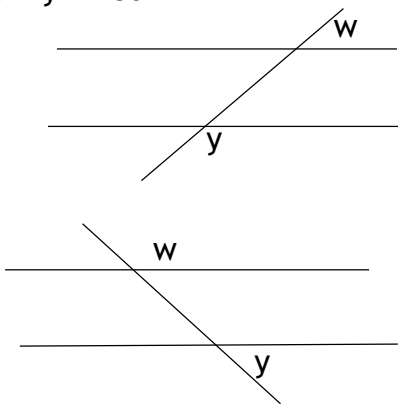
Co-interior Angles and Co-exterior Angles.

Note: The sum of Co-interior angles and Co-exterior angles is equal to 180^o

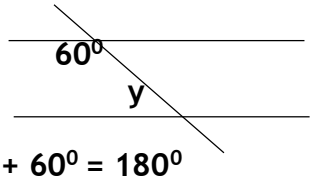
Co-interior angles
$a + b = 180^0$



Co-exterior angles
$w + y = 180^0$



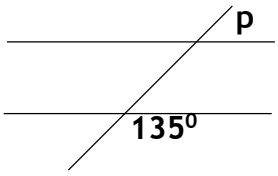
For example;
Find the value of angle marked y



$y + 60^0 = 180^0$
$y + 60^0 - 60^0 = 180^0 - 60^0$
$y + 0 = 120^0$
$y = \underline{120^0}$

P.O.W
180^0
$- 60^0$
120^0

For example;
Find the size of the angle marked p



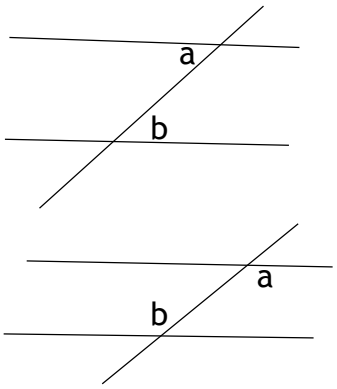
$p + 130^0 = 180^0$
$p + 130^0 - 135^0 = 180^0 - 130^0$
$p + 0 = 50^0$
$p = \underline{50^0}$

P.O.W
180^0
$- 130^0$
50^0

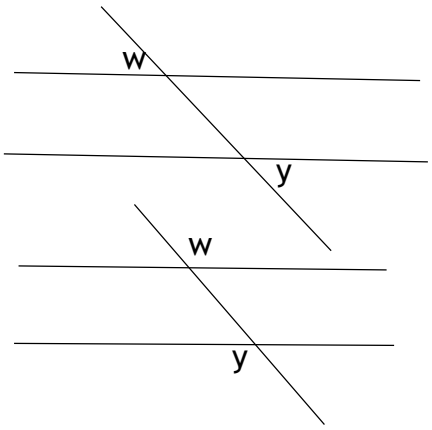
Alternate Interior Angles and Alternate Exterior Angles

Note: All alternate angles are equal.

Alternate Interior angles
a = b (alt angles)

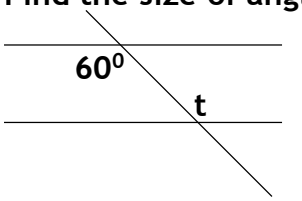


Alternate Exterior angles
w = y (alt angles)



For example;

Find the size of angle marked t^0

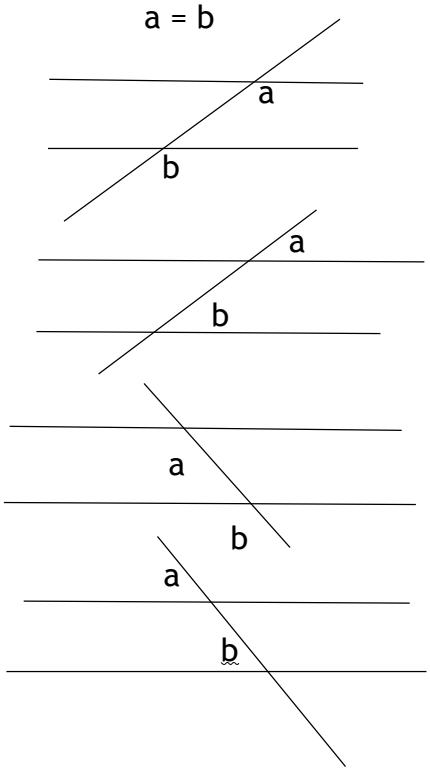


t = $\underline{\underline{60^0}}$ (alternate angles)

CORRESPONDING ANGLES.

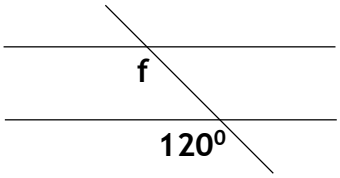
Note: All Corresponding angles are equal.

a = b



For example;

Find the size of angle marked f.



f = $\underline{\underline{120^0}}$ (corresponding angles)

INTEGERS

Positive (+) × Negative (-) = Negative (-)

Negative (-) × Positive (+) = Negative (-)

Positive (+) × Positive (+) = Positive (+)

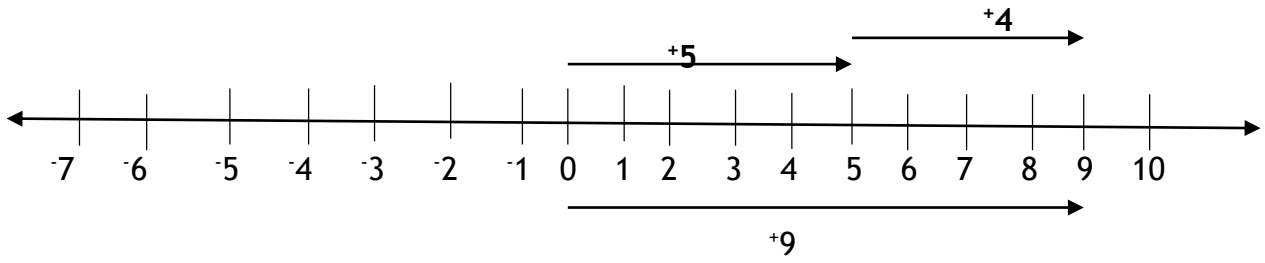
Negative (-) × Negative (-) = Positive (+)

NOTE: Same/similar signs give positive results.
Different signs give negative results.

BUT: When positives are greater than negatives, the result is positive.
E.g. $^{+}5 + ^{-}3 = ^{+}2$.

When negative is greater than positive, the result is a negative.
E.g. $^{+}2 + ^{-}5 = ^{-}3$.

For example;
Work out: $^{+}5 + ^{+}4$



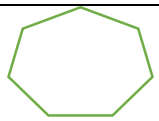
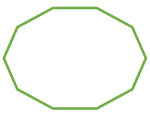
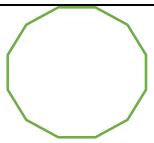
So, $^{+}5 + ^{+}4 = \underline{\underline{^{+}9}}$

For example;
Workout: -3 + -2 (Using mind map)
-3 + (-2)
-3-2

-ve	**- - - - -**	**-5**
+ve		

So, -3 + -2 = $\underline{\underline{-5}}$

POLYGONS.

SHAPE	NUMBER OF SIDES
Triangle 	3
Quadrilateral Like: Rectangle, Square, Parallelogram, Kite, Trapezium and Rhombus. 	4
Pentagon 	5
Hexagon 	6
Septagon 	7
Octagon 	8
Nonagon	9
Decagon 	10
Hendagon/Nuodecagon	11
Duodecagon 	12

Aid to memory

- A polygon is a simple closed figure joined by line segments at its end points (vertices). The prefix “POLY” means many. “GONS” means corners.

BASES

BASES	BASE NAME
Base one (1)	Unary base
Base two (2)	Binary base
Base three (3)	Trinary base/ternary base
Base four (4)	Quaternary base
Base five (5)	Quinary base
Base six (6)	Senary base/Seximal base
Base seven (7)	Septenary base/Septimal base
Base eight (8)	Octal base/Octonary base
Base nine (9)	Nonary base
Base ten (10)	Decimal base
Base eleven (11)	Undecimal base/undenary base
Base twelve (12)	Duodecimal base/dozenal

EXAMPLES:

1. Change 100_{two} to base ten.

100_{two} = (1 × two twos) + (0 × twos) + (0 × ones)

= (1 × 2 × 2) + (0 × 2) + (0 × 1)

= 4 + 0 + 0

= 4_{ten}

Aid to memory:

To change non-decimal bases to decimal base, we multiple each digit in the numeral by its place value and then find the sum of the values.

2. Change 12_{ten} to base two.

Base	No.	Rem
2	12	0
2	6	0
2	3	1
2	1	1
	0	

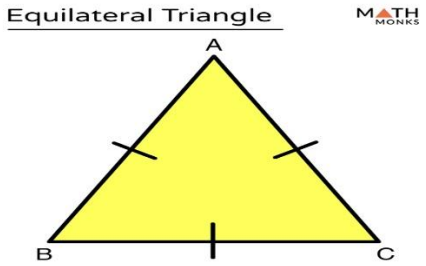


12_{ten} = 1100_{two}

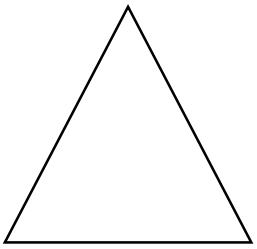
Note: To change from decimal base to non-decimal base, we divide the given base ten number by given non-decimal base and record the remainders. We then read the remainders starting from the bottom.

TYPES AND PROPERTIES OF TRIANGLES.

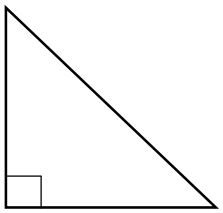
1. Equilateral Triangle.
   Has all the 3 sides equal
   All angles are equal
   Has 3 lines of symmetry



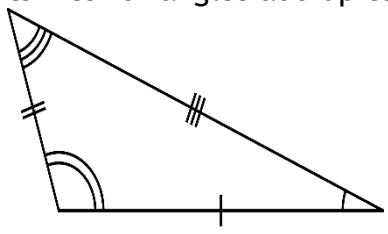
2. Isosceles triangle
   Two of its 3 sides are equal
   Two opposite angles are equal
   Has 1 line of symmetry
   Its interior angles add up to 180^0
   Its exterior angles add up to 360^0



3. Right- angled scalene triangle
   All sides are different
   All angles are different but one of them is 90^0
   Has no line of symmetry
   Its interior angles add up to 180^0

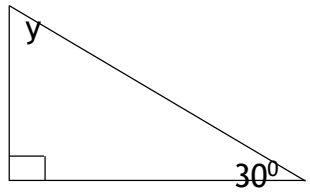


4. Scalene Triangle
   All Its 3 sides are not equal
   All angles are not equal
   Its interior angles add up to 180^0



EXAMPLES:

1. Find the size of angle y.



$y + 30^0 + 90^0 = 180^0$ (angle sum of Δ)

$y + 120^0 = 180^0$

$y + 120^0 - 120^0 = 180^0 - 120^0$

$y = \underline{\underline{60^0}}$

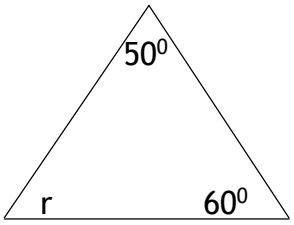
s/w

180^0

$-\ \underline{120^0}$

$\underline{60^0}$

2. Find the size of r.



$r + 50^0 + 60^0 = 180^0$ (∠ sum of Δ)

$r + 110^0 = 180^0$

$r + 110^0 - 110^0 = 180^0 - 110^0$

$r = \underline{\underline{70^0}}$

s/w

180^0

$-\underline{110^0}$

$\underline{70^0}$

ROMAN NUMERALS

Basic/Key Roman numerals.

Hindu-Arabic	1	5	10	50	100	500	1000
Roman numeral	I	V	X	L	C	D	M

NOTE: Other Roman numerals are got by either repeating or adding or subtracting.

Numerals beginning with the digits 2 and 3 are got by repeating.

Hindu-Arabic	2 = (1+1)	20 = (10+10)	200=(100+100)
Roman numeral	II	XX	CC
Hindu-Arabic	3=(1+1+1)	30=(10+10+10)	300+(100+100+100)
Roman numeral	III	XXX	CCC

Numerals beginning with the digits 6, 7 and 8 are got by adding.

Hindu-Arabic	6=(5+1)	60=(50+10)	600=(500+100)
Roman numeral	VI	LX	DC
Hindu-Arabic	7=(5+2)	70=(50+20)	700=(500+200)
Roman numeral	VII	LXX	DCC
Hindu-Arabic	8=(5+3)	80=(50+30)	800=(500+300)
Roman numeral	VII	LXXX	DCCC

Numerals beginning with the digits 4 and 9 are by subtracting.

Hindu-Arabic	4=(1 from 5)	40=(10 from 50)	400=(100 from 500)
Roman numeral	IV	XL	CD
Hindu-Arabic	9=(1 from 10)	90=(10 from 100)	900=(100 from 1000)
Roman numeral	IX	XC	CM

NOTE: When Roman numerals, a letter is never repeated more than three times.

EXAMPLES:

1. Express **CMLXXV** as a Hindu Arabic numeral.

CMLXXV = CM LXX V

= 900 + 70 + 5

= **975**

2. Write **555** in Roman numerals.

555 = 500 + 50 + 5

= D L V

= DLV

DIVISIBILITY TEST.

Divisibility test of 2: The numbers ending with even digits like 0, 2, 4, 6 and 8 are divisible by 2. **E.g.** 682, 794, 370, 968, etc.

Divisibility test of 3: A number is exactly divisible by 3 if the sum of its digits is divisible by 3 or if the sum is a multiple of 3. **E.g.** 255 = 2+5+5 = 12 (12 is a multiple of 3 so, 255 can be divisible of 3).

Divisibility test of 4: A number is divisible by 4 if the number formed by its last two digits is divisible by 4 or multiple of 4. **E.g.** 572. The last two digits are 7 and 2, the number formed is 72 and 72 is a multiple of 4 so 572 can be divisible by 4.

Divisibility test of 5: A number is divisible by 5 if it ends with 5 or with 0. **E.g.** 20, 35, 470, 5675.

Divisibility test for 6: A number is divisible by 6 if it is divisible by **2** and **3.** In other words a number is divisible by 6 if it is even and the sum of its digits is divisible by 3. **E.g.** 612 is divisible by 6 since it is an even number and the sum of its digits 6+1+2 = 9 is divisible by 3.

Divisibility test for 7: A number is divisible by 7 if the last digit of a number is doubled and the result is subtracted from the number formed by the remaining digits. The outcome is divisible by 7. **E.g.** take **315,** the last digit is 5 and the remaining number is 31, double 5 to get (5+5) = 10
Subtract 10 from 31 to give (31-10) = 21. 21 is divisible/multiple of 7, hence 315 is also divisible by **7.**

Divisibility test for 8: A number is divisible by 8 if the number formed by the last three digits is divisible by **8. E.g.** The number 4376, **376** is the number formed by the last three digits which is divisible by 8 therefore, **4376** is divisible by **8.**

Divisibility test for 9: A number is divisible by 9 if the sum of its digits is divisible or a multiple of **9. E.g.** 135 the sum is (1+3+5) = 9.

Divisibility test for 10: A number is divisible by 10 if the digit in the ones place (at end) is **0. Or** a number which is divisible by 10 is also divisible by **2** and **5. E.g.** 70, 800, 180, 3050.

Divisibility test for 11: A number is divisible by 11 if the difference between the sum of the digits in **even places** and the sum of the digits in the **odd places** is zero (**0**).
E.g.



Sum of the number in odd position = 4 + 9 + 7 = 20.
Sum of the number in even position = 8 + 3 + 9 = 20.
The difference between sum of the numbers in even positions and sum of numbers in odd positions is 20 – 20 = 0. So **489379** is divisible by 11.

TYPES OF NUMBERS.

Square numbers: When a number is multiplied by itself once, you get a square number. **E.g.** 5 × 5 = 25.

Cube numbers: When a number is multiplied by itself three times, a cube number is formed. **E.g.** 3 × 3 × 3 = 27

Triangle number: When you add consecutive counting numbers from 1, the sum is always a triangle number.
1 = **1**
1 + 2 = **3**
1 + 2 + 3 = **6**
1 + 2 + 3 + 4 = **10**

Prime numbers: A prime number has only 2 factors (one and itself). **E.g.** 2, 3, 5, 7, 11, 13.

Composite numbers: A composite number has more than 2 factors. **E.g.** 4, 6, 8, 9, 10, 12.

Even numbers: Are numbers which are divisible by 2.
E.g. 0, 2, 4, 6, 8, 10, _ _ _

Odd numbers: Are numbers which are not divisible by 2 or When divided by two it gives **1** as a reminder.
E.g. 1, 3, 5, 7, 9, 11, 13, _ _ _

POINTS TO NOTE IN ANSWERING OR MAKING

1. All the working to the answers must be clearly shown.

2. Accuracy in the figures and diagrams is very important.

3. Ensure correct units are included on the answers.

4. All the work (steps) should be shown.

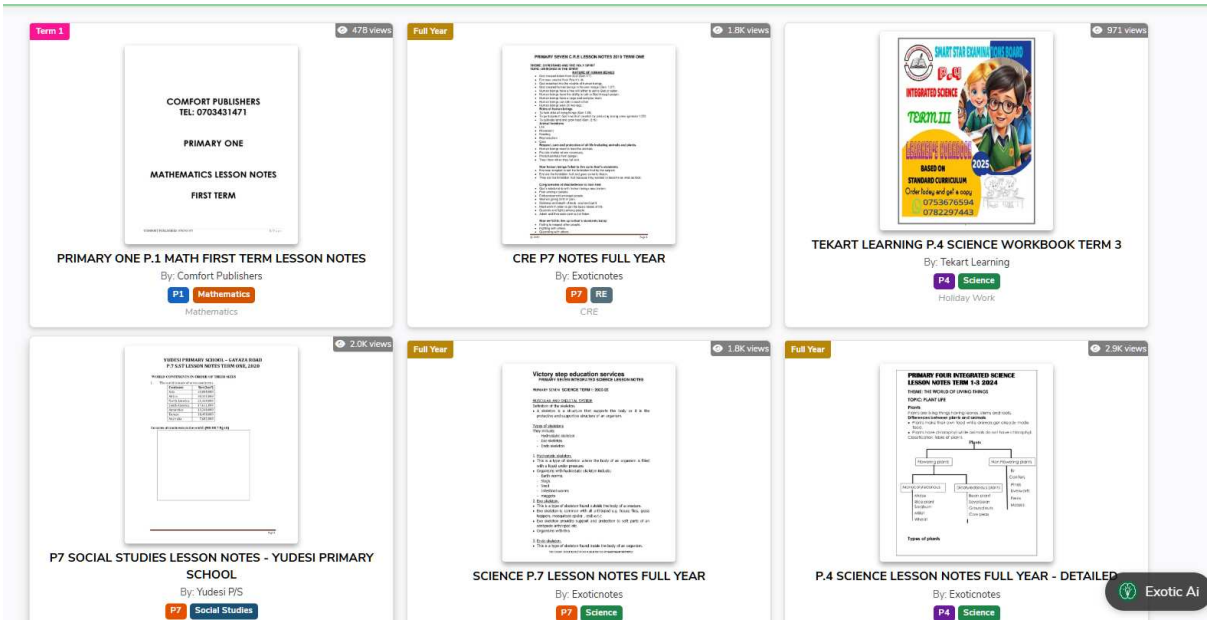
5. Omission of units leads to loss of marks.

6. Change of parameters for example using “X” instead of “y” given in the question leads to loss of marks.

7. Omission of labels on diagrams leads to loss marks.

8. Sketches are awarded marks.

This document was downloaded from https://exoticnotes.com



Do you need more LESSON NOTES for Primary (All classes)?

Click
https://exoticnotes.com/notes/primary/

If you need LESSON NOTES for SCIENCE (P.1 – P.7)
Click
https://exoticnotes.com/notes/primary/science/

If you need LESSON NOTES for English (P.1 – P.7)
Click
https://exoticnotes.com/notes/primary/english/

If you need LESSON NOTES for Mathematics (P.1 – P.7)
Click
https://exoticnotes.com/notes/primary/mathematics/