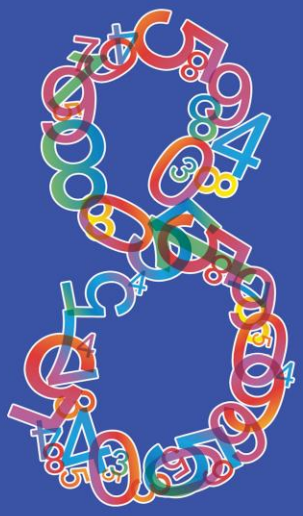
MATHEMATICS

YEAR 8



Curriculum Development Unit

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MATHEMATICS YEAR 8

STRAND : M1:NUMBER AND NUMERATION

SUB-STRAND : M1.1 WHOLE NUMBERS

Achievement Indicator:

- Oder 4 to 6 digit numbers to a million.
- Read any 4 to 6 digit number names in the correct order.
- Break up 4-6 digit numbers into two six sets of numbers

Counting 4- 6 digit numbers:

4 digit numbers e.g. 2,345 is read: Two thousand three hundred and forty five.
5 digit numbers e.g. 12,674 is read: Twelve thousand six hundred and seventy four.
6 digit numbers e.g. 353 796 is read: Three hundred and fifty three thousand seven hundred and ninety six
7 digit numbers e.g. 2,598,251 is read: Two million five hundred and ninety eight thousand, two hundred and fifty one

1. Write these numbers in words:
   a. 265,687 b. 23,897 c. 6,242,167

2. Oder these numbers from the lowest to the highest.(ascending order)
   a. 143 654, 87 459, 189 786, 2 998, 1 654 908, 245 776, 12 888.

   b. 9999, 267 545, 34 123, 999 875, 5 388, 198 789.

   c. 16 567 345, 546 567 887, 12 545 699, 6 980 298, 890 567 154.

Achievement Indicator:

- Breaking up 6 digit numbers into sets of numbers:

E.g. 893 673 = 800,000 + 90,000 + 3 000 + 600 + 70 + 3 (6 sets)
Or = 890,000 + 3,000 + 600 + 73 (4 sets)
Or = 890,000 + 3,000 + 673 (3 sets)
Or = 893 000 + 673 (2 sets)

Break up 4 to 6 digit numbers into two six sets of numbers

3. Break up these numbers into the number of sets shown in the brackets.
   a. 356 981 (4 sets) b. 78 531 (3 sets)
   c. 682 175 (6 sets) d. 289 451 (2 sets)

Multiples, Common Multiples and Lowest Common Multiples

MULTIPLES:	**FACTORS:**
Find the multiples of 6 and 8	Find the Factors of 12 and 20
M{6} = {6,12,18,24,30,36,42,48,54,60...}	F {12} = {1, 2, 3, 4, 6, 12}
M{8} = {8,16,24,32,40,48,56,64,72,80,.....}	F {20} = {1, 2, 4, 5, 10, 20}
Find the Common Multiple of 6 and 8	Find the Common Factors of 12 and 20
{24, 48 ...}	{1, 2, 4}
The Lowest Common Multiple **[LCM]** is 24	The Highest Common Factor **[HCF]** is 4

4. Show the multiples of these numbers:
   a. M{45} b. M{60} c. M{50} d. M{25}

5. Find the factors of these numbers:
   a. 100 b. 60 c. 30 d. 120

6. Calculate the following:
   a. M{8}
      M{12}
      M{8}∩M{12}
      LCM of 8 and 12

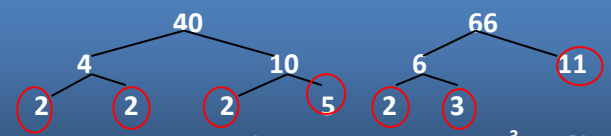
   b. F{24}
      F{30}
      F{24}∩F{30}
      HCF of 24 and 30

   c. M{6}
      M{4}
      M{6}∩M{4}
      LCM of 6 and 4

   d. F{42}
      F{20}
      F{42}∩F{20}
      HCF of 42 and 30

PRIME FACTORS

Factor Tree for 40 and 66 are shown below.



The Prime Factors of 40 is 2 x 2 x 2 x 5 = 2^3 x 5 [factors in base index form]

The Prime Factors of 66 is 2 x 3 x 11

7. Find the prime factors of the following numbers:
   a. 35 b. 30 c. 80 d. 90

8. Use Factor Tree to find the prime factors of these numbers.

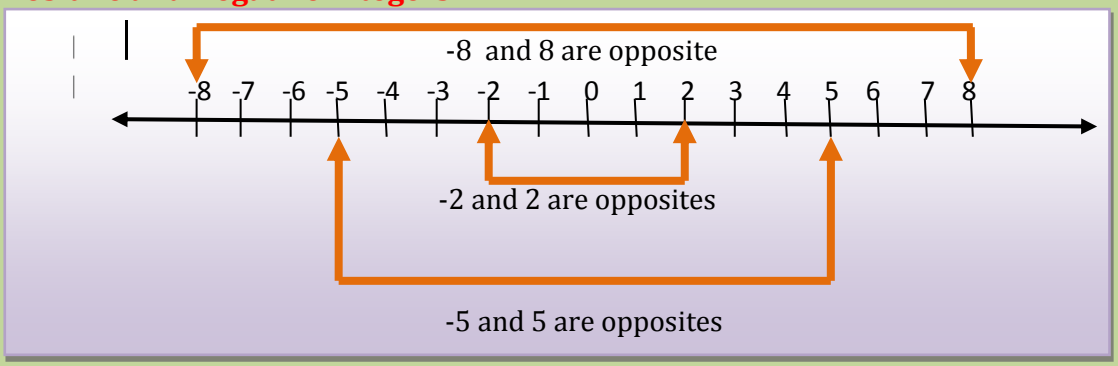
   a. 40 b. 120 c. 240

SUB STRAND M1.2: INTEGERS

Achievement Indicators:

- **Read, write and order of ascending and descending numbers.**
- **Plot on the number lines indicating negative numbers.**

Positive and Negative Integers



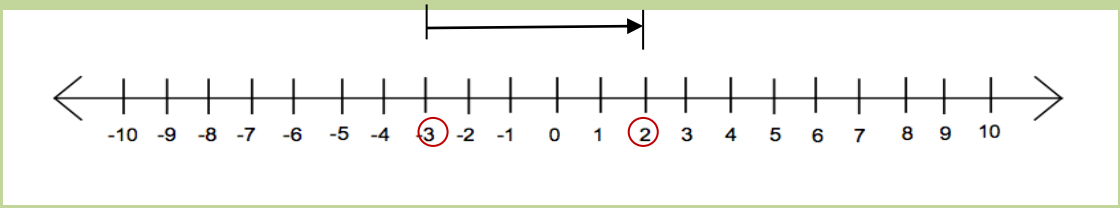
Negative number

Positive number

Addition and Subtraction of Integers

-3 + 5 = 2

This is represented in a number line below.



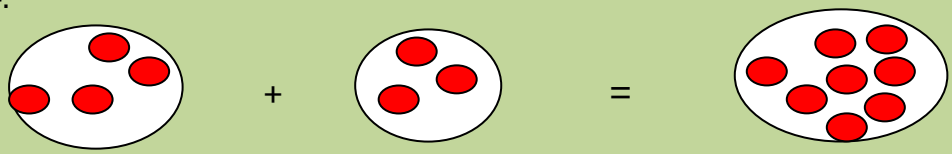
Exercise:

1. Determine whether the balance of these numbers were positive or negative.
   a. 1960 to 1970
   b. 2014 to 1420
   c. 1976 to 1993
   d. 2009 to 2015

2. Determine whether the years were increasing or decreasing during the following period:
   a. 1990 to 1986
   b. 1874 to 1987
   c. 2006 to 2016
   d. 2008 to 2003

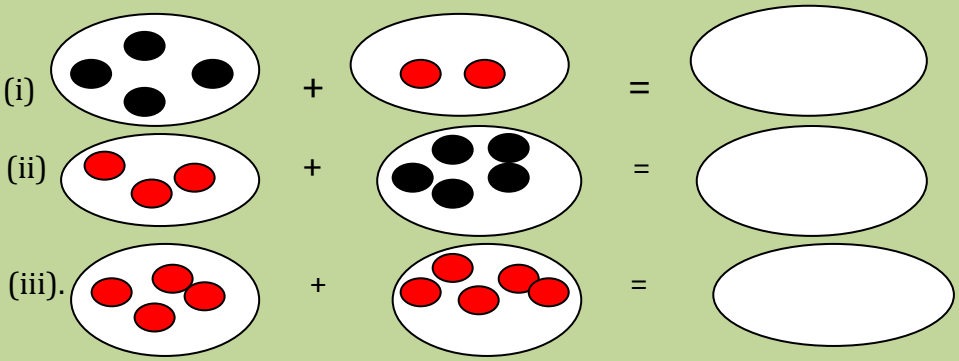
3. Combining a debt of $5 with a credit of $3, what will be the result? Is it a debit or a credit?

4.

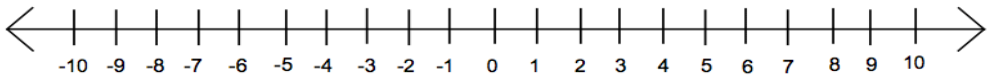


-4 + -3 = -7

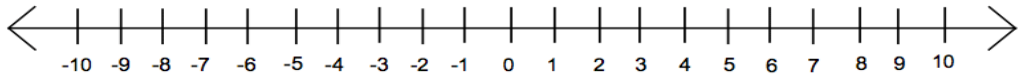
a Complete the sets given below with their working.



b. Show this problem on the number line. -2 + 5



c. Show this problem on the number line. 5 - 9



5. Calculate the following problem
   (i) -5 + -9
   (ii) 3 - -3
   (iv) 8 + -4
   (v) -2 – -5

6. Find an integer that satisfies each equation.

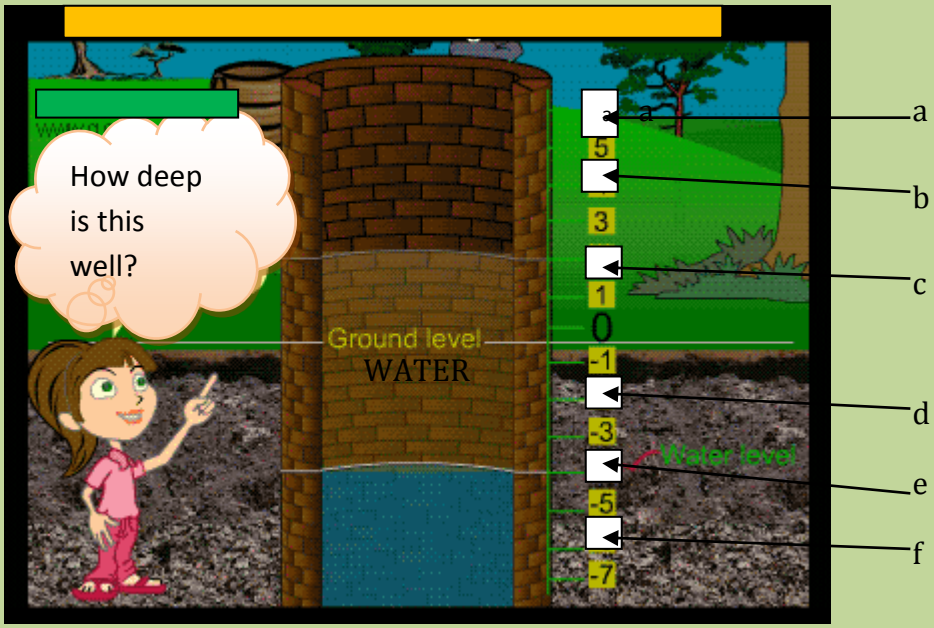
a. 174 + ☐ = 0

b. -351 + ☐ = 0

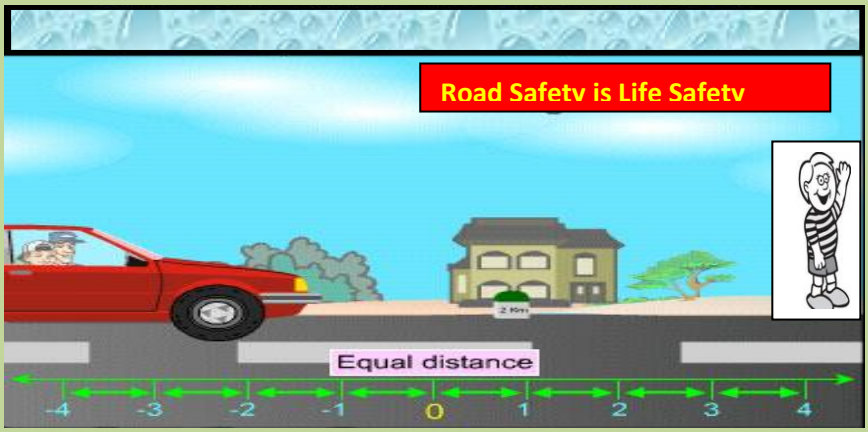
c. 98 + ☐ = 0

d. -672 + ☐ = 572

7. Fill in the boxes.(☐) alongside the well with the appropriate numbers to show the height and the depth of the well.



a. What is the distance of the boy in metres from the car?



RULES OF SIGNS FOR ADDITION

Let ***a*** and ***b*** be positive numbers

1. Negative plus negative equal negative — **-3 + -7 = -(3 +7) = -10**
2. Positive plus negative equals positive if $a > b$ — **13 + -5 = 13 - 5 = 8**
3. Positive plus negative equals negative if $a < b$ — **6 + ⁻11 = ⁻(6 – 11) = ⁻5**

RULES OF SIGNS FOR MULTIPLICATION

Let ***a*** and ***b*** be positive integers

4. Positive times negative equal negative — **5 x ⁻2 = ⁻(5 x 2) = ⁻10**
5. Negative times positive equals negative. — **⁻7 x 3 = ⁻(7 x 3) = ⁻21**
6. Negative times negative equals positive. — **⁻4 x ⁻5 = 4 x 5 = 20**

Simplify the following:

a. -3 x - 4

b. 6 x - 5

c. -12 x 5

d. -15 x -10

f. 2 x - 5 x - 3

g. -8 x 9 x -10

h. -9 x - 9 x 2

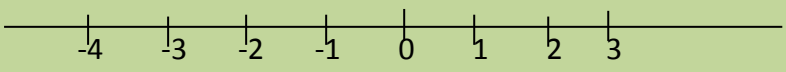
i. 25 x -2 x 3

Number Plane

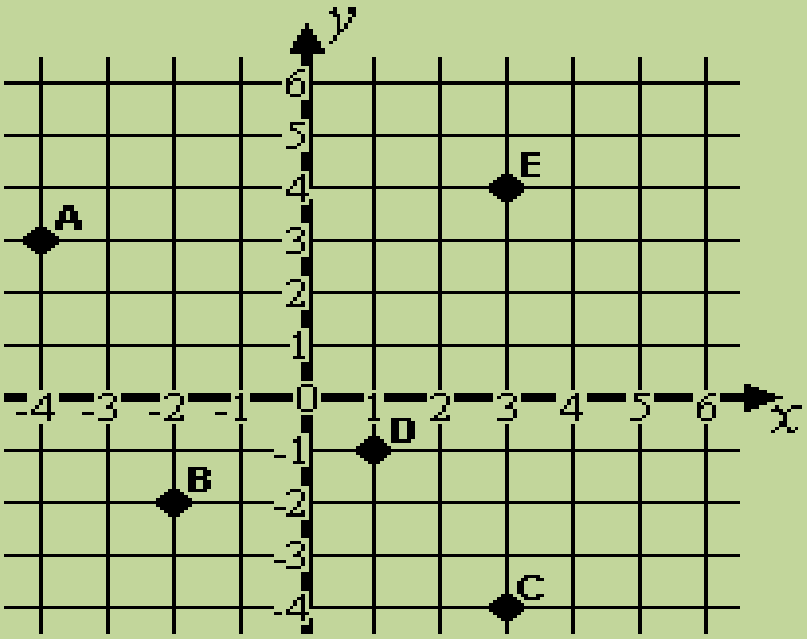
It is easy to plot a point on a horizontal number line.

For example: Plot the following point on the number line

X = -3, M = -1 and P = 2



However, the same idea can easily be extended to cover whole number plane by including negative x values negative y values.



The coordinates of the 5 points.

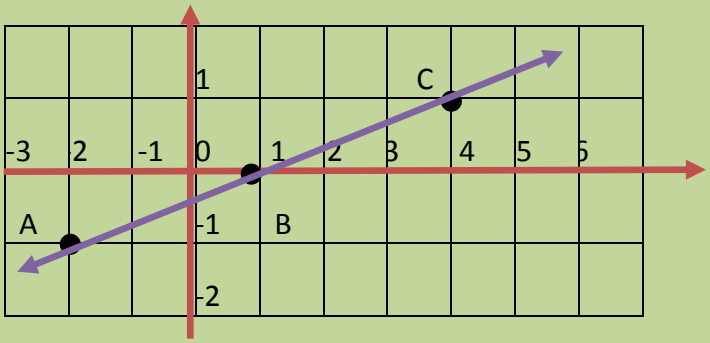
(i) B (-2, -2) (ii) D (1, -1) (iii) C (3, -4)

(iv) A (-4, 3) (v) E (3, 4)

Drawing lines in a number plane.

Plot these points on the number plane and then join the points.

A. (-2,-1) B (1,0) C (4,1)

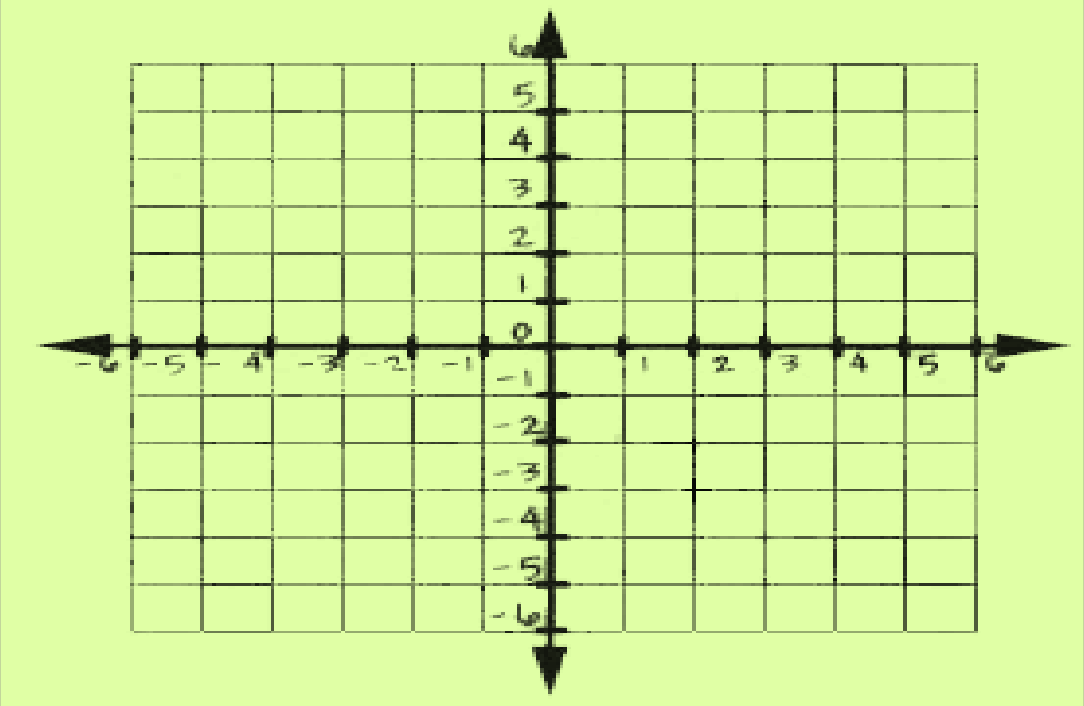


Exercise

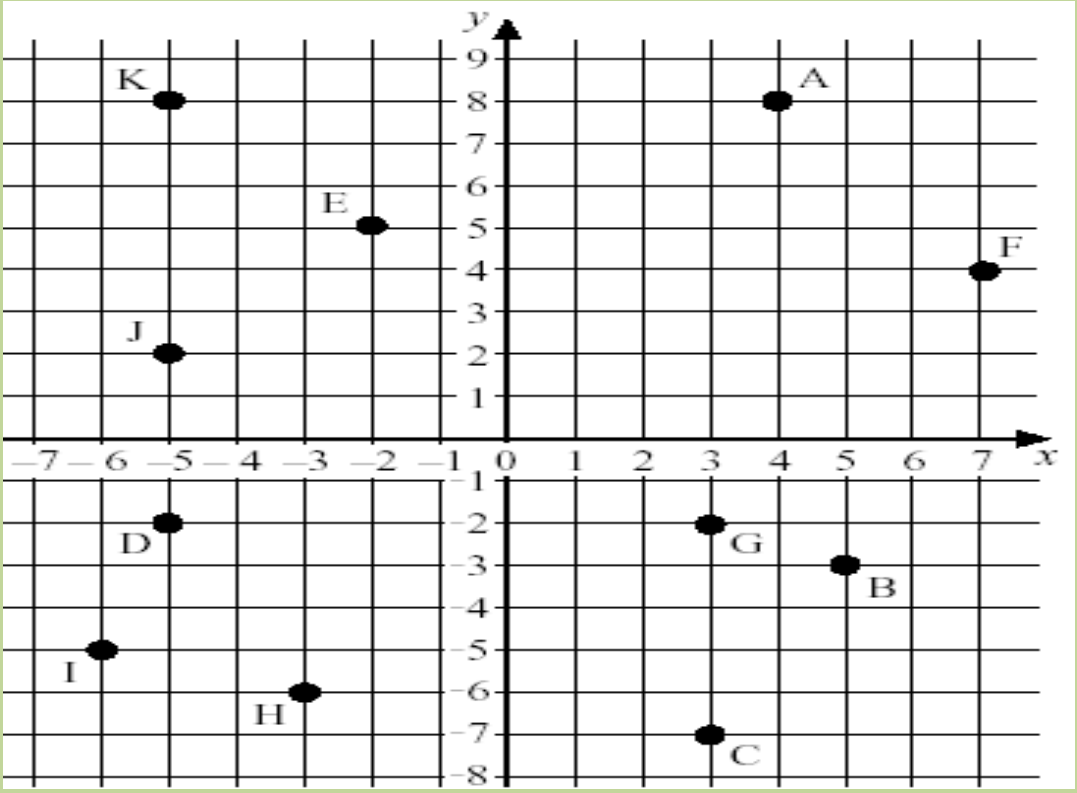
Use the Number Plane to plot these points.

A. (0, 6) B. (-3 , 6) C. (6, -4) D. (-5, -4) E. (-6, -6)

F. (4 , 0) G. (6, -6) H. (-6, 0) I. (5, -11) J. (0, -6)



b. Name the coordinates of the points shown on the number plane.



2. Draw your number plane, plot these points and join them.

a.	A. (3, 0)	B. (1, 2)	C. (0, 3)	D. (-1 , 4)
b.	M (-1 , -2)	N. (0, 0)	O. (1, 2)	P. (2, 4)
c.	E. (6,1)	F. (3,1)	G. (0,1)	H. (-2 , 1)
d.	R. (-2, 4)	S. (-2, 1)	T. (-2, 0)	U. (-2, -4)

DECIMALS

Achievement Indicators:

a.State, read and write decimal measures to three decimal places
b. Calculate changes, and money spent to $10, 000 and beyond.
c. Express fractions involving tenths, hundredths and thousandths as decimals.
d. Use mathematical operations by whole numbers, 100, and 1000s and by other

Activity

1. Write the place values of the numbers underlined.

a.	285 234. 9**8**7	b.	**7**41 . 890	c.	347 234. 12**62**
d.	3 345 876. 1543	e.	34**9**. 786	f.	45. 987**6**

2. Calculate the following. Write the answers to 3 decimal places.

a. 234. 123	b. 76.24	c. 198.675
x 1.2	x 2.3	x 3.4
468246	22872	794700
2341230	152480	5960250
280.9476	**175.352**	**675.4950**
280.947	**175.352**	**675.495**

Exercise

1. Calculate the following decimal problems and write the answers to 3 decimal places.
   a. 254 .754 x 2.9
   b. 56. 2678 x 2.5
   c. 87. 154 x 6.8
   d. 754. 438 x 3.21
   e. 398. 654 x 4.5
   f. 89. 276 x 7.5
2. Alipate went to town to buy the following goods.

1 pkt of Milk - $6.75
1 bag rice - $57.95
6 #15chicken-$108.65
1 bag sugar - $75.85
1 bag flour - $65.65

If he takes $500.00 with him, what will be his change after buying these goods?

3. Mr Terry withdrew from his account these amounts of money to pay his workers.
   525 - $20 note
   1075 - $10 note

He has to pay 135 workers with $150.00 each
How much money will be left after paying all his workers?

4. Mr and Mrs Nasila had $150,000. They divided this amount towards the following:

Maintenance of the house – 0.4	
Labour cost	- 0.2
Food	- 0.15
Travelling	- 0.1
Others	- 0.15

   a. How much was spent in each Maintenance and Food?
   b. How much would be used for others?

5. The amount of money that was given to the Red Cross Society for the Disaster by some N.G.Os totalled up to $250,000. This is shared in different ways:

Food	**-**	**0.35**
Water	**-**	**0.15**
Tents	**-**	**0.12**
Clothes	**-**	**0.15**
Travelling	**-**	**0.11**
Others	**-**	**0.12**

   a. How much money was spent on each item?
   b. Why has food got the highest proportion of money?
   c. What does N.G.O mean?

6. Veidovu Primary school received $50,000 from Red Cross after the flood which caused a lot of damages to their school. This is how they divided the money to meet the needs of the school:

Desks	**-**	**0.25**
Chairs	**-**	**0.15**
Textbooks	**-**	**0.2**
Repair	**-**	**0.2**
Stationeries	**-**	**0.2**

7. $25.00 was given to 3 boys. Josua received 0.2 of the money, Sepo received 0.5 and Tebu received 0.3.
   Calculate how much each boy received.
8. 3500 spectators watch the Chow Games at the ANZ Stadium. If 0.25 of them are women, 0.35 are children, find out how many men were there watching the game .
9. The number of students who took part in a sports competition is 350. These are the details of the students taking part in different sports.

Rugby	**-**	**0.35**
Netball	**-**	**0.25**
Hockey	**-**	**0.12**
Soccer	**-**	**0.13**
Volleyball	**-**	**0.15**

   Calculate how many students took part in each sport.

Decimal Fractions.

$\frac{1}{2}$ = 0.5 $\frac{1}{4}$ = 0.25 $\frac{3}{4}$ = 0.75 $\frac{1}{5}$ = 0.2

Exercise

1. Calculate the following:

   a. $\frac{3}{4}$ of \$45.62 b. $\frac{4}{5}$ of 29.50km c. $\frac{1}{5}$ of 3hr 25min

   d. $\frac{5}{6}$ of 3.186L e. $\frac{3}{5}$ of 39.55m f. $\frac{2}{3}$ of 32.4hrs

2. Express these fractions in decimals

   a. $\frac{3}{5}$ b. $\frac{4}{5}$ c. $\frac{1}{2}$ d. $\frac{3}{4}$

   e. $\frac{7}{10}$ f $\frac{45}{100}$ g. $\frac{175}{1000}$ h. $\frac{78}{1000}$

   i. $\frac{13}{1000}$ j. $\frac{7}{1000}$ k $\frac{67}{10}$ l. $\frac{32}{100}$

3. Lina bought a material for her family's clothes. She bought 12.5m of blue material, 35.5m of red material and 4.5m of yellow material.
   a. If she uses only $\frac{3}{4}$ of blue material, how many metres of blue material is left?
   b. If she uses only $\frac{3}{5}$ of red material, how many metres of red material is left?
   c. If she uses $\frac{5}{6}$ of yellow material, how many metres of yellow material is left?
   d. Find out how many metres of materials (i) are used.
   (ii) are not used.

4. In a local Maths store, a calculator costs \$54.75, a Maths Text book cost \$12,35, a Mathematical set cost \$15.25 and rulers cost \$0.35
   If you buy 1 calculator, 3 rulers and 2 mathematical set and a textbook, how much change would you get if you take \$150.00?

5. There are 350 workers in a factory. ⅗ of the workers are Women. How many are not women in the factory?

6. Simplify the following.
   e.g. 0.15 of 2m = $\frac{15}{100} \times \frac{200\text{cm}}{1}$
   = 30cm

   a. 0.25 of 12km d. 0.15 of \$145.00

   b. 0.45 of 5L e. 0.2 of 3m

   c. 0.125 0f 35km f. 0.15 of 3hrs

7. The earth travels around the sun at a speed of 18.5 miles per second. Venus travels around the sun at 1.19 times the speed of the earth. How fast does the planet Venus travel per second?
8. This year Gary earned 2.5 times as more as he earned two years ago.

    a. Two years ago he earned $4 534.95. How much will he earn this year?

    b. This year he will earn $9 218.50. How much did he earn two years ago?

9. Gina has a 15.3 page long book to finish on Friday. On Monday she does 4.48 pages. On Tuesday she does 4.48 pages. On Wednesday she does 1.9 pages. How many pages has Gina left to write?
10. Sam swims three days a week and rest the other four days. On Monday he swam a total of 2.45 miles. On Tuesday he swam 2.65 miles. On Wednesday he swam 3.85 miles.
    How many miles did he swim that week?

Calculating by 10s, 100s and 1000s

e.g 12.67 x 10 = 126.7 37.8 x 100 = 3780 5.15 x 1000 = 5150

11.23 ÷ 10 = 1.123 78.26 ÷ 100 = 0.7826 129 ÷ 1000 = 0.129

When you multiply by 10, 100 and 1000, move the decimal point to the right according to the number of zero**. e.g. 23.54 x 10 = 234.5**
When dividing with 10, 100 and 1000, move the decimal point to the left according to the number of zeros**. e.g 23.45 ÷ 100 = 0.2345**

Exercise

1. Calculate the following

a. a. 123.78 x 100 b. 897.13 ÷ 10

c. 24.6 ÷ 10 d. 453.965 x 10

e. 89.9 x 100 f. 567.89 ÷ 100

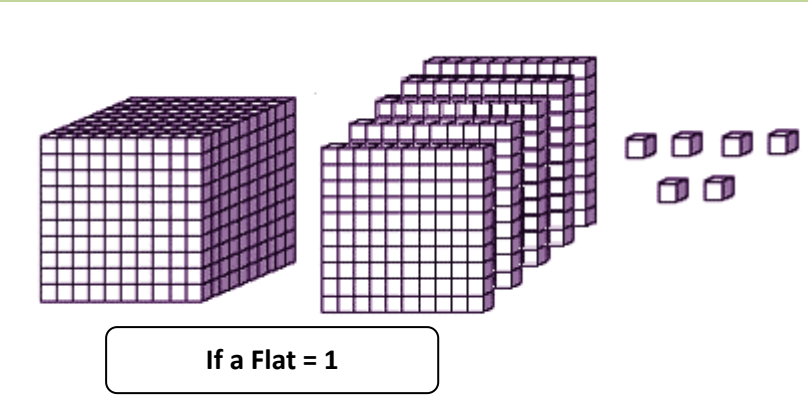
g. 23 ÷ 1000 h 4.5 x 100

2. 675 students in a school. The canteen is giving out 100 apples free for all the students. Calculate how much would a child receive from the apple?

3. 25 scouts went out camping with two Scout Leaders. They were given 10 apples each. Calculate how many apples altogether were given.

4. During the National Brushing Day, each student receives 10 pamphlets each on tooth brushing drills. If there were756 students the school, how many pamphlets were given out

DIenes Block Representation of Decimal

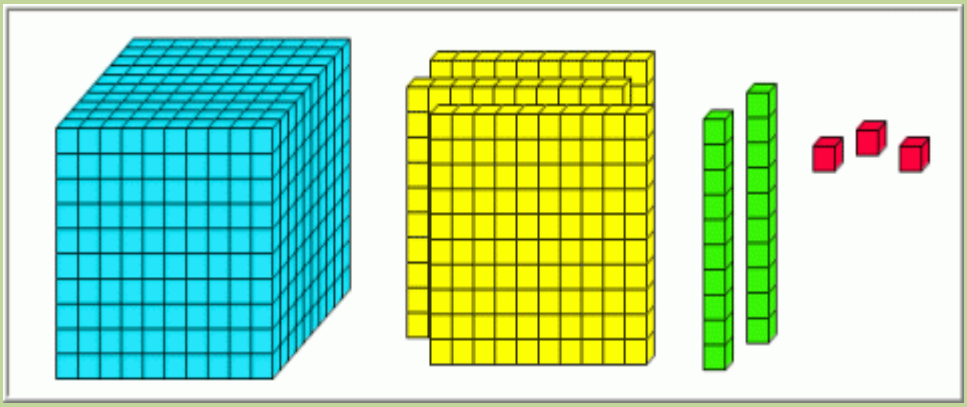


The value of the dienes block above would be 15 . 06

i.e.	1 block	-	10	(tens)
	5 flats	-	5	(units)
	0 stick	-	0.0	(tenths)
	6 cubes	-	0.06	(hundredths)

Exercise.

1. Use the dienes block below to answer the questions that follows.



a. Write down the values of the dienes block shown above if the value of:
   (i) Block is = 1
   (ii) Flat is = 1
   (iii) Sticks is = 1
   (iv) Cube is = 1

Find the value of each set of dienes blocks by using the information given.

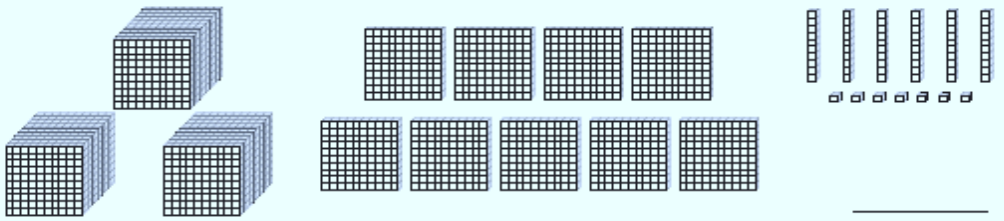
Cube = 1, **Stick** = 10, **Flat** = 100 **Block** = 1000

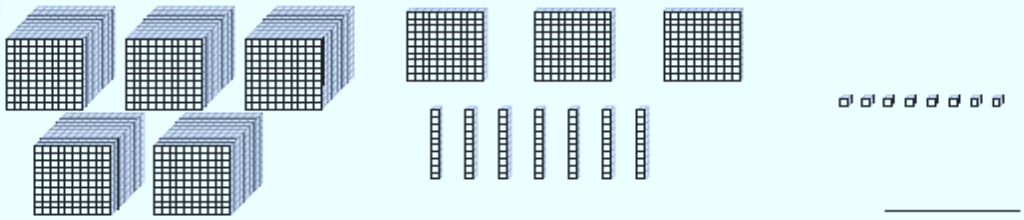
2

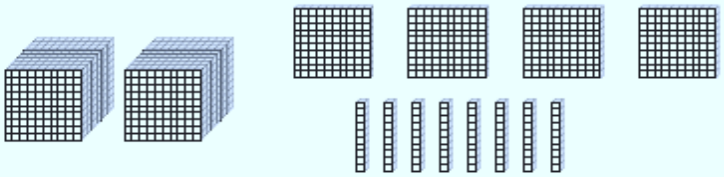
Name : _____ Score : _____

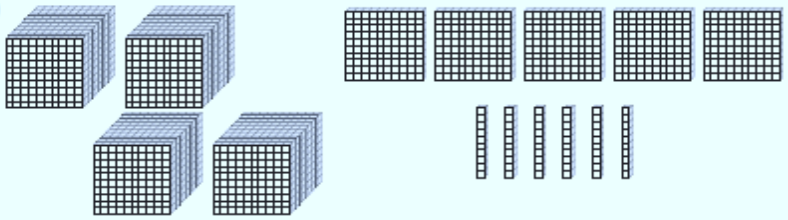
Thousands & Hundreds

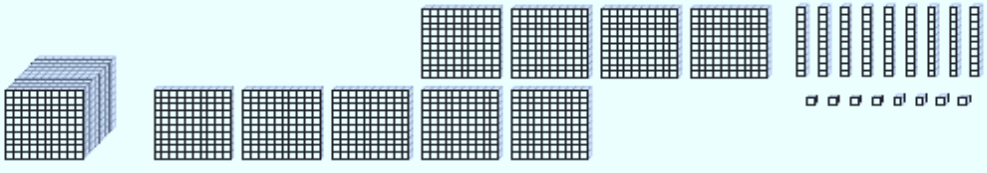
Write the number formed by base ten blocks.

1)  _____

2)  _____

3)  _____

4)  _____

5)  _____

STRAND M2 : ALGEBRA MATH 8

SUB STRAND M2.1 - PATTERNS

Achievement Indicators:

a. Solve for unknowns in an equation

b. Specify and write square numbers and triangular numbers

c. Express 5^3

Example :

(i) $4p = 12$

$p = 3$

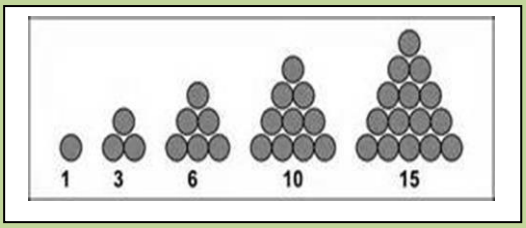
(ii) $\frac{m}{5} = 3$

$m = 15$

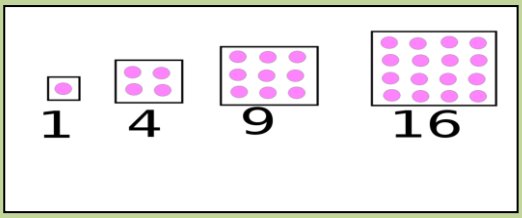
(iii) $w + 7 = 20$

$w = 13$

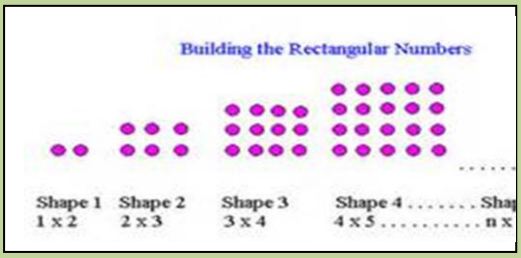
Triangular Numbers



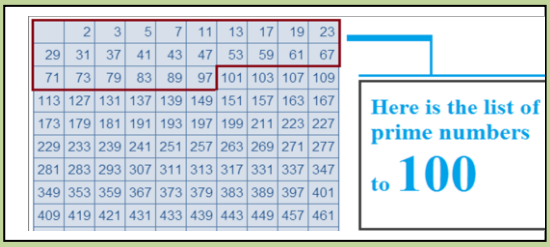
Square Numbers



Rectangular Numbers



Prime Numbers



Longhand:

(i) $6^3 = 6 \times 6 \times 6$

(ii) $5^6 = 5 \times 5 \times 5 \times 5 \times 5 \times 5$

(iii) $9^4 = 9 \times 9 \times 9 \times 9$

(iv) $10^3 = 10 \times 10 \times 10$

Exercise :

1. Find out which number breaks the sequence in each pattern.

   a. 1, 3, 5, 7. 8, 9, 11, 13,

   b. 1, 4, 5, 9, 16, 25, 29, 36

   c. 35, 40, 45, 50, 54, 55, 60, 65

   d. 1, 3, 6, 8, 10, 15, 21, 28

2. If Set A is the set of all whole numbers less than 20 which are not multiples of either 2, 3, or 5.
   List the elements of set A.

3. State Set S, the set of counting numbers.
   (a) Is it a finite or an infinite set?
   (b) List all the Square numbers in Set S.
   (c) List all Triangular numbers in Set S.
   (d) List all the Prime numbers in Set S

4. Find the value of the pro-numeral.

   (a) $7n = 49$
   (b) $12p = 132$
   (c) $35h = 525$
   (d) $\frac{m}{4} = 3$
   (e) $9m = 81$
   (f) $25b = 100$
   (g) $112k = 224$
   (h) $\frac{h}{7} = 34$

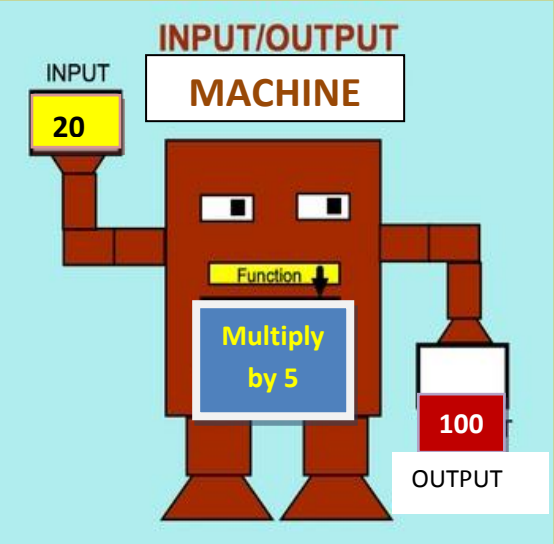
5. Write the following in longhand and calculate the answers:

   (a) 4^3 (b) 12^4 (c) 11^5 (d) 25^3

5. What pattern is shown in these sequences of numbers?

   a. 1, 3, 6, 10, 15 ...
   b. 1, 4, 9, 16, 25 ...
   c. 1, 2, 5, 26, 677 ...
   d. 1, 5, 3, 7, 5, 9, 7, 11 ...
   e. 3, 6, 5, 10, 9, 9, 18, 17 ...

Number Machine



The in input for the number machine is 20 with the rule as multiply by 5. The output becomes 100.

20 x 5 = 100

Input = *i*

Output = *r*

If the first input is the first 5 counting numbers, then the pattern of output would be:

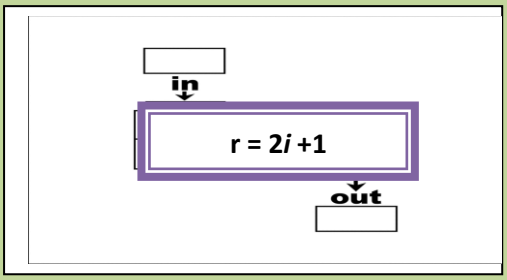
The rule for the machine is r ***= 5i***

5, 10, 15, 20, 25....

Exercise:

Use these number machines to list the set of outputs it gives out.

(i).



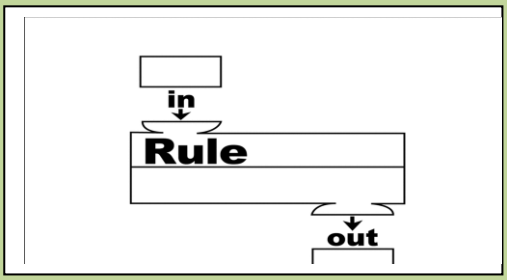
If the **input** is the first 5 whole numbers, write down what the **outputs** would be.

(ii)

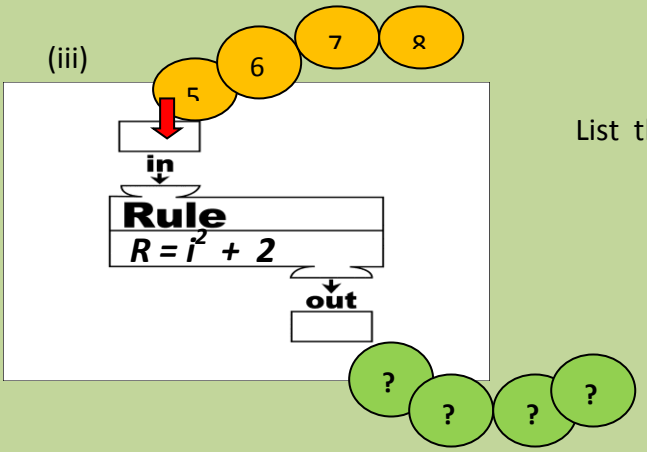
This machine produces the following outputs when the first 5 square numbers are used as inputs.

5, 8, 13, 20, 29...

What is the rule for the machine?



(iii)



List the output using the rule $r = i^2 + 2$

M2.2 : EQUATIONS

Achievement Indicators

a. Expand shortened expressions

b. Substitute any pro-numeral and solve for an unknown

c. Generate an equation from a word problem

d. Write equations and adhering to the order of operation rules

Shorthand:

(i) a + a + a + a + a = 5 x a = **5a**

(ii) 2 x a x m x b = **2abm**

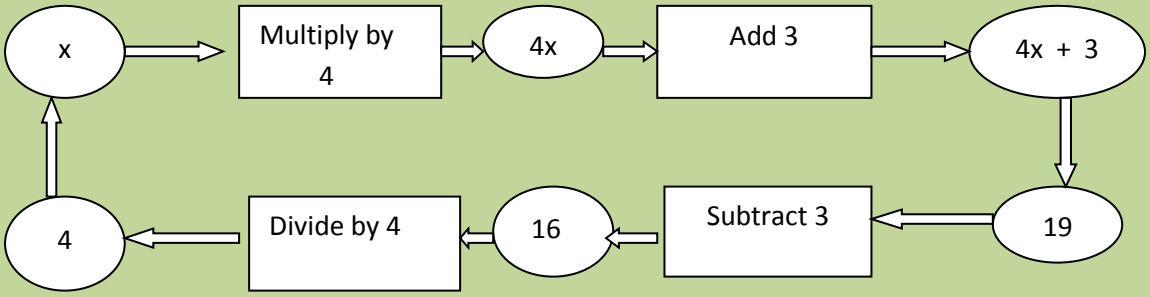
(iii) 3w x 2w x 2m = **$12mw^2$**

(iv) p x p x p = **p^3** **(p** to the power of 3 or **p** cubic)

(v) g x g = **g^2** **(g** to the power of 2 of **g** squared)

Flow Chart

Solve 4x + 3 = 19



$4x + 3^{-3} = 19^{-3}$ ⟹ Subtract 3(Opposite of +3)

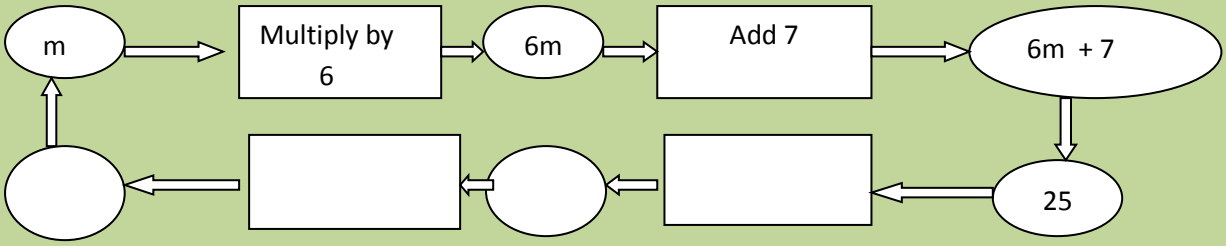
$\frac{4x}{4} = \frac{16}{4}$ ⟹ Divide by 4(Opposite of x4)

X = 4

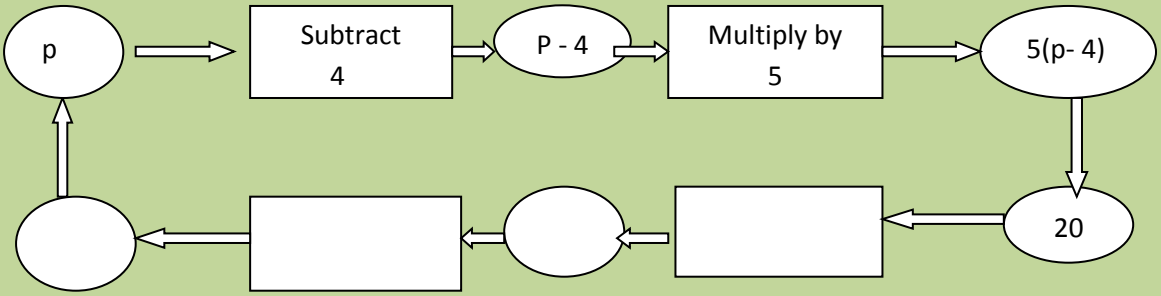
Exercise:

Complete the following flow chart to find the value of the pro-numeral.

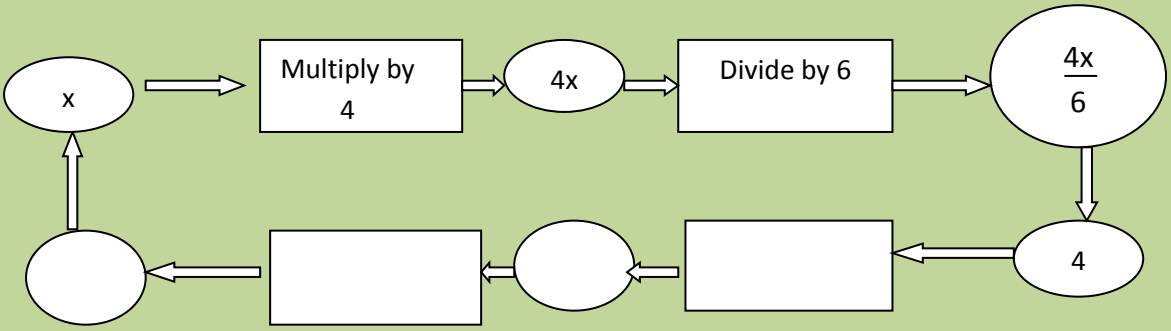
(i) Solve 6m + 7 = 25



(ii). Solve 5(p-4) = 20



(iii) Solve $\frac{4x}{6} = 4$



(iv) Solve these equations without using the flow chart.

a. 4p + 2 = 18

b. 8(m-3) = 24

c. 7p – 9 = 12

d. $\frac{3x}{6} = 3$

(v) Use the flow chart to solve these equations

a. $8p - 5 = 35$

b. $7m + 6 = 27$

c. $2b - 9 = 11$

(vi) Write an equation from these word problems.

a. A car bought for $m was sold at a profit of 13% . What was the selling price.

b. A rectangle is three times as long as it is broad. If it is x cm long, find its

(i). perimeter
(ii). Area

c. 30 girls in Year 8 plays different sports. H girls play hockey, N girls play netball, B girls play both.

i. How many girls play hockey but not netball?
ii. How many girls play netball bat not hockey?

d. Last week Fred had $47. He washed cars during the weekend and now he has $50. How much money did he earn for washing cars during the weekend.

e. Botia collected 74 sea shells on the beach. He gave some to Shally and he had 41 left. How many shells were given to Shally?

Adding and Subtracting in Algebra.

In Algebra, one can only add or subtract like terms.

Like Terms: 5a, 2a, 7a....

Unlike Terms: 7a, 3b, 2ac....

Example:

(i) $2x + 3y + 5x + y = 7x + 4y$

(ii) $6m - 3n + 2m + 5n = 8m + 2n$

(iii) $6a - 3b - 2a - 6b = 4a - 9b$

(iv) $8ab + 5b - 10ab - 2b = -2ab + 3b$

EXERCISE

1. Find the following in shorthand.

(i) p + p + p + p + p

(ii) a x a x a x a x a

(iii) 8m + 2q x 3m + 4q

(iv) 3a + 6b + 5b + 2a

(v) 7y – 2y + 4y

2. (i) 5m - 2a - 3m - 2a (iii) 6p + 4ab + 7p - 3ab

(ii). 7n - 3b + 5n - 5b (iv) 8w - 3a - 2w - 2a

3 Simplify the following equations:

E.g

$\frac{x}{3} + \frac{x}{4} = \frac{4x + 3x}{12} = \frac{7x}{12}$ (Find the Lowest Common Denominator)

a. $\frac{4a}{5} - \frac{2a}{3}$

b. $\frac{3m}{4} + \frac{6m}{7}$

c. $\frac{6m}{10} + \frac{4m}{5}$

d. $\frac{2b}{5} - \frac{3b}{4}$

MULTIPLYING AND DIVIDING ALGEBRA

In multiplication p x q is written **pq**

In division, p ÷ q is written $\frac{p}{q}$

E.g Simplify the following.

(i) -8 x 2m = -16m (Negative times positive = negative)

(ii) a x b x 5 a = $5a^2b$ ($a \times a = a^2$. Numbers are always written in front)

(iii) -12m ÷ 6 = $\frac{-12m}{6}$ = -2m (negative ÷ positive = negative)

NOTE: Simplifying algebraic fractions is done in the same way as ordinary fractions, by dividing the numerator and the denominator by the highest common factor.

THE INDEX LAWS

When multiplying like terms, add the indices or powers.

$$a^m \times a^n = a^{m+n}$$

$$a^4 \times a^6 = a^{4+6}$$

When an expression in brackets is raised to a power, then multiply the indices

$$(a^3)^4 = a^{3 \times 4}$$
$$= a^{12}$$

When dividing like terms, subtract the bottom index from the top index.

$$\frac{a^m}{a^n} = a^{m-n} \qquad \frac{m^8}{m^2} = m^{8-2} = m^6$$

Exercise

1. Simplify the following:

a. $2a \times a \; 3b \times 2b$

b. $-3m \times 2n$

c. $-3a \times -2a \times -4a$

d. $5m^3 \times 6m^1$

e. $4a^3 \times 5a^2$

f. $\frac{m^7}{m^3}$

g. $8^6 \div 4^2$

h. $\frac{w^4}{w^2}$

i. $10^5 \div 2^3$

h. $\frac{p^8}{P^5}$

2. Simplify the following

a. $\frac{3a}{5} + \frac{2a}{5}$

b. $\frac{6x}{7} + \frac{x}{7}$

c. $\frac{5m}{6} - \frac{2m}{6}$

d. $\frac{7n}{9} - \frac{2n}{3}$

e. $\frac{5a}{6} - \frac{2a}{4}$

f. $\frac{8f}{9} - \frac{3f}{4}$

3. Simplify these division using index laws.

a. $(m^3)^2$

b. $(x^5)^3$

c. $(w^4)^3$

d. $(a^2)^4$

e. $(3x^2)^2$

f. $(2ab)^3$

g. $(a^2\,b^3)^2$

h. $(2x^2\,y^3)^3$

4. Solve these word problems using equations to find the unknown.

   a. A car travels at ***x*** km/ hr for 14 km, then increases speed by 8 km/ hr and travels for a further 6km. How far did the car travel?

   b. Samu collected ***n*** number of coconuts in day one. He collected 250 coconuts in 5 days. Find out how many coconuts did he collect in each day.

   c. Simon is ***x*** years old. His father is 3 times older than him. If Simon's father is 36years old, how old is Simon.

   d. A fisherman caught **x** number of fish in a day. If he caught 300 fish in 5 days, how many fish did he catch in a day?

5. 301 students of Kuluvotu Primary school went on a trip to the Kula Eco Park in Sigatoka. All seven buses were filled and 7 students had to travel in cars. How many students were in each bus?

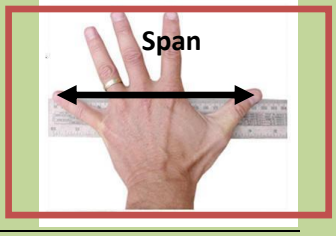
STRAND : M3:MEASUREMENTS

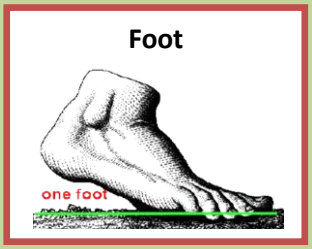
SUB-STRAND : LENGTH/AREA

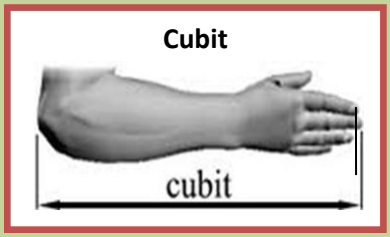
Achievement Indicator:

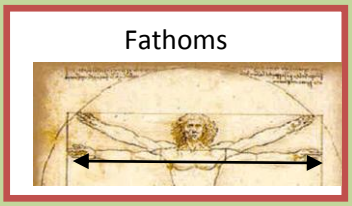
- Express length and area using appropriate units and language of comparison.
- Calculate any length and area using basic mathematical formulas
- Express volume and capacity using appropriate units and language of comparison

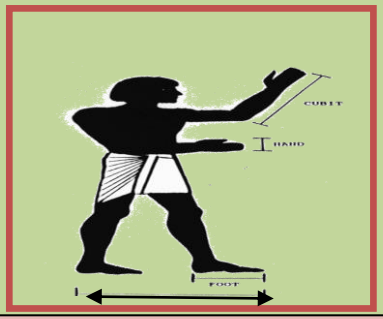
Non-Standards Units of Length. (Customary Units)











Standard Units.

Measuring Length – The basic unit for measuring length is the **metre** (**m**), hence the name ***'metric* system'**.

Two units which are fractions of metre and are commonly used are ***centimetre (cm)*** and ***millimetre (mm***).

Another longer unit which is in common use is ***kilometre (km)***.

You will need to learn that:

1 kilometre (km)	= 1000metres (m)
1 metre	= 100centimetres (cm)
1 centimetre	= 10 millimetres

Exercise:

1. Use Non-Standards units to measure the following and then state which would be the most appropriate Standard unit best to measure the following:

a. length of the classroom

b. width of the playground

c. distance between your classroom and office

d. length of your Maths text book

e. thickness of your 4C Maths Ex book

e. length of the Queens Highway

2. Convert these measure into the units required.

a. 120 cm = _____m

b. 1243m = _____km

c. 2.4km = _____m

d. 29.15m = _____cm

e. 2.5cm = _____mm

3. Find the length and the widths of these things listed below and write their appropriate units.

(i) playground

(ii) your desk

(iii) the classroom door

(iv) teacher's table

(v) the box of match

(vi) the 4C Maths Exercise Book

(vii) your classroom floor

(viii) the blackboard

4. The height of each goal post is 12m. Write the total height of the two posts in mm

5. The distance from Tomasi's home to school is 2.5km. If he goes to school daily, how far did he travel in 1 week? Write your answer in **m.**

6. The area of this football field is 5000m^2. What is the length and the with of the field?
7. The area of this swimming pool is 72$m^{2.}$ If the width is 6m, what is the length of the pool in cm?

8. This road in Naitasiri is about 12.9km. Write this distance in m

9. Measure your friend's waist and the length of their arms and fill in the table below.

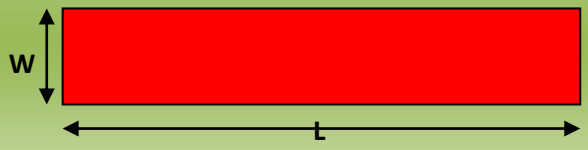
Names	Length of Waist	Length of arm

AREA

Achievement Indicator:

- Calculating any length and area using basic mathematical formulas.

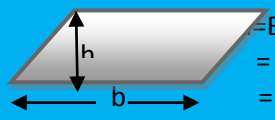
- **PERIMETERS: is the sum of all the distances around shape.**
  Perimeter of a rectangle is calculated by :



Perimeter = 2 x (L + W)

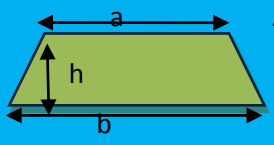
FORMULAS FOR AREAS OF BASIC SHAPES

Parallelogram



=Base x vertical height
= b x h
= bh

Trapezium

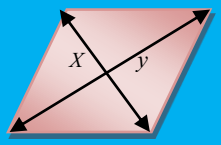


Area = $\frac{\text{height x sum of parallel sides}}{2}$

$= \frac{h \times (a+b)}{2}$

$= \frac{1}{2}(a+b)h$

Rhombus

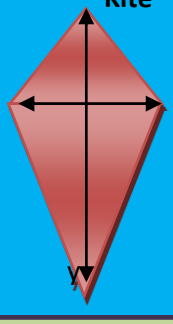


Area= $\frac{\text{product of diagonals}}{2}$

$= \frac{x \times y}{2}$

$= \frac{1}{2}xy$

Kite



Area= $\frac{\text{product of diagonals}}{2}$

$= \frac{x \times y}{2}$

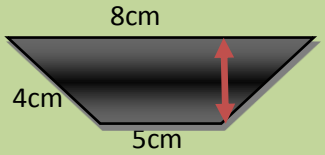
$= \frac{1}{2}xy$

NOTE: ***Diagonals*** are the two lines which join the opposite corners. With the ***rhombus*** and the ***kite***: x and y represents the two diagonals.

Exercise

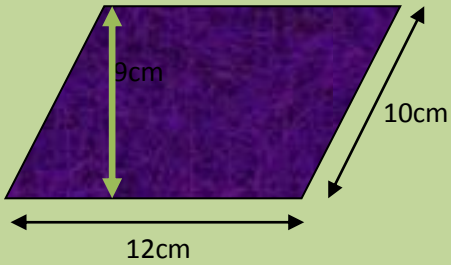
1. Find the area of each shape shown below.

a.

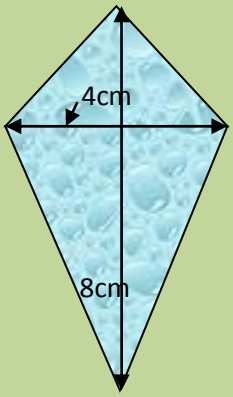


c.

b.

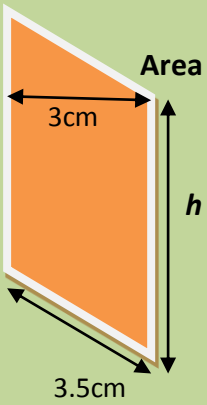


d.

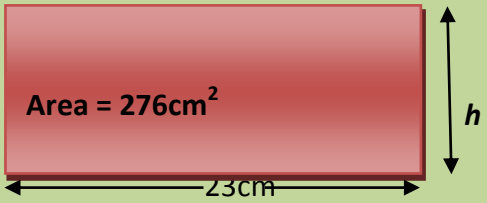


2. Find the height (h)of this shape.

a.



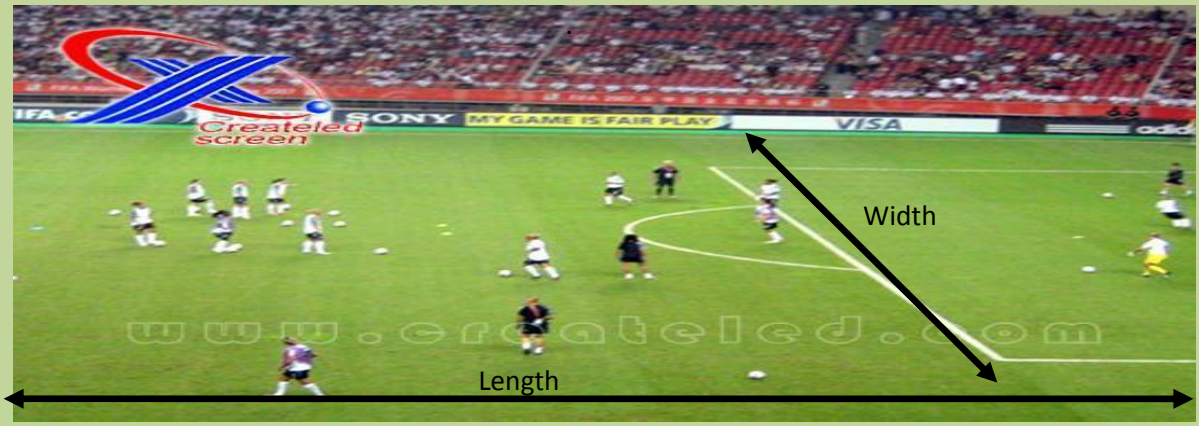
b.



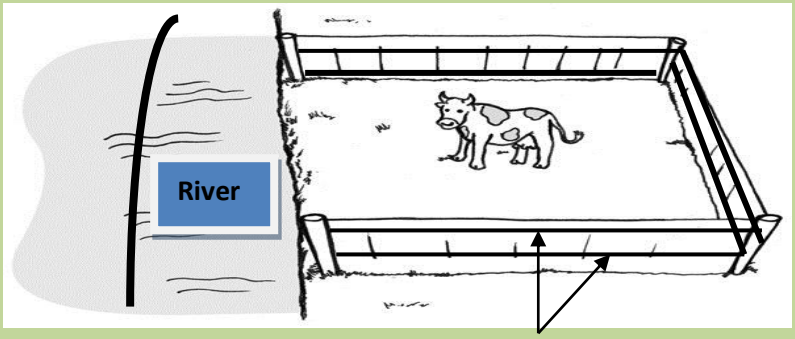
3. The measurement of a football ground is **100m long** and **50m wide.**

(a) What is the perimeter of the ground?

(b) Find the area of the ground

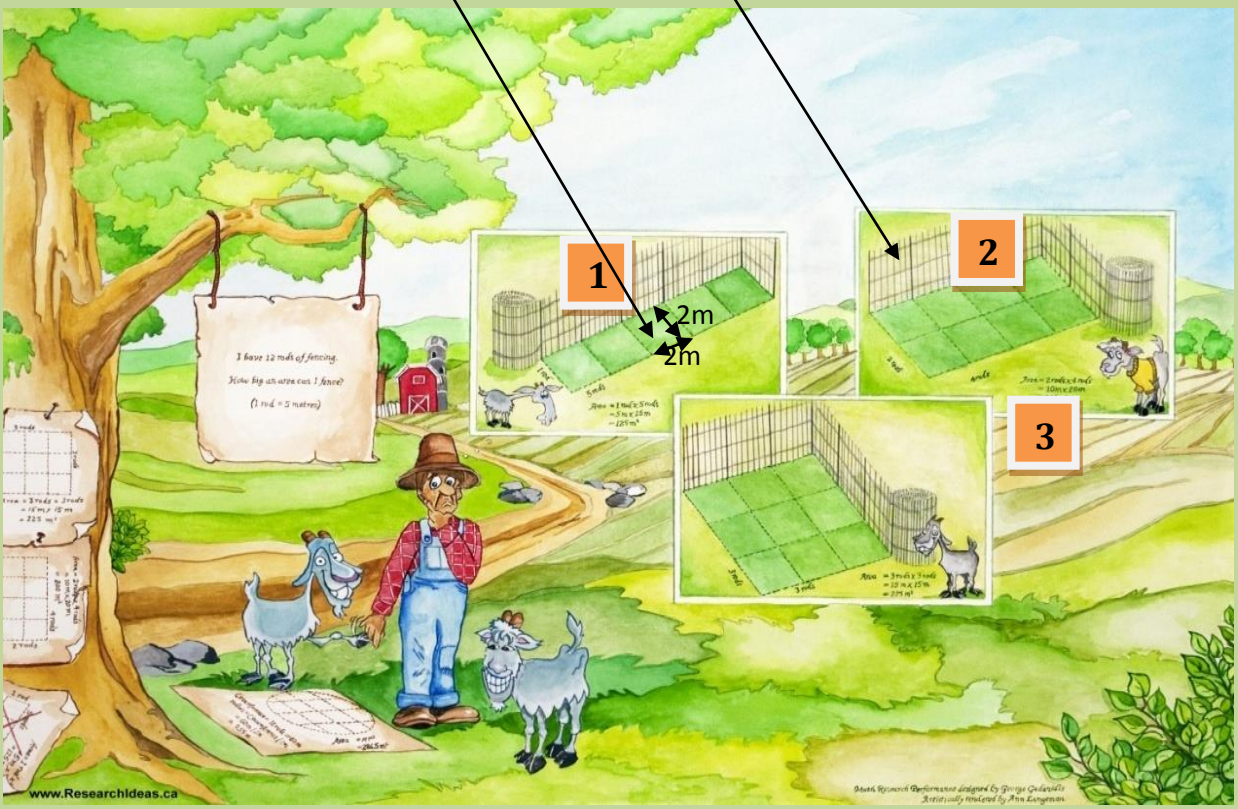


4. Mr Deo wants to make a fence for his cow closer to the river. He needs two strands of wire to make the fence. The length of the fence is 32m and its width is 26m .What length of wire is needed to make the fence?



Double stranded wire

5. Mr Old Mac Donald wants to build a fence for his three goats. The fence are numbered **1, 2** and **3**. He placed the ***green squares of grass carpet*** which is **2m** x **2m** inside before he put the fence around it. Calculate the length of **wire netting** he needed for each fence.



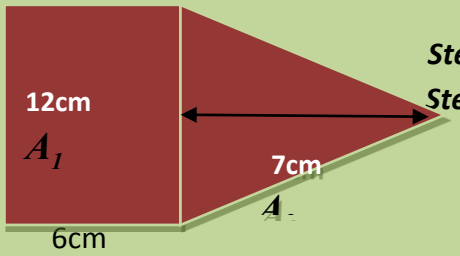
COMPOSITE AREAS

Composite areas are calculated for complicated shapes. The areas of complicated shapes can be found by splitting the shape up into simpler shapes (shapes which are easy to find its area).

STEP 1: Split up the composite shape into 2 or simpler shapes.

STEP 2: Find the area of the simpler shape.

STEP 3: Add up the areas to give the area of the composite area.



Step 1: Split into simpler Shapes – **A_1 , A_2**

Step 2: Area of **A_1**= ***lw*** Area of **A_2**= ½ bh

= 6 x 12 =½ x12x7

= 72cm^2 = **42c**

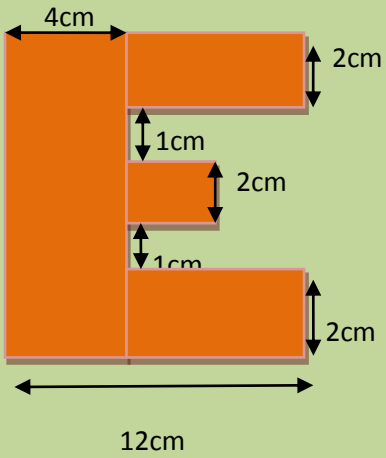
Step 3: Total Area = 72cm^2 + 42cm^2

= **<u>114cm^2</u>**

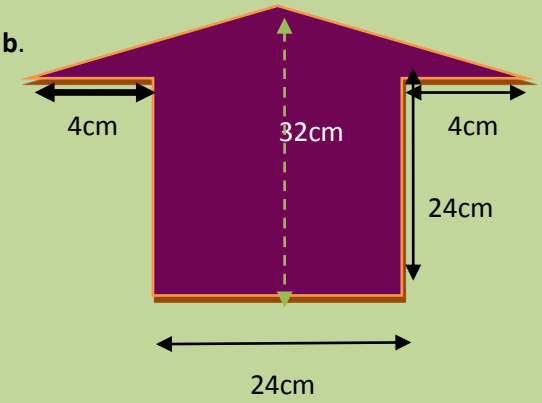
<u>Exercise</u>

1. Calculate the area and perimeter of these complicated shapes

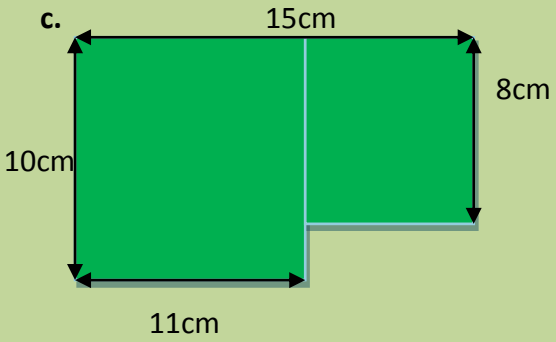
a



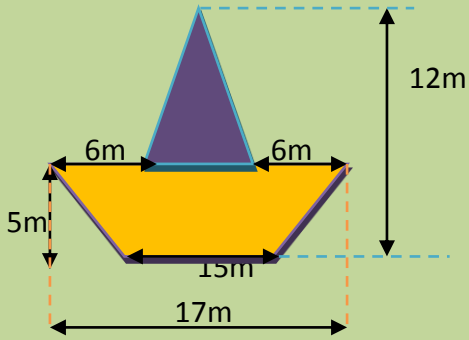
b.



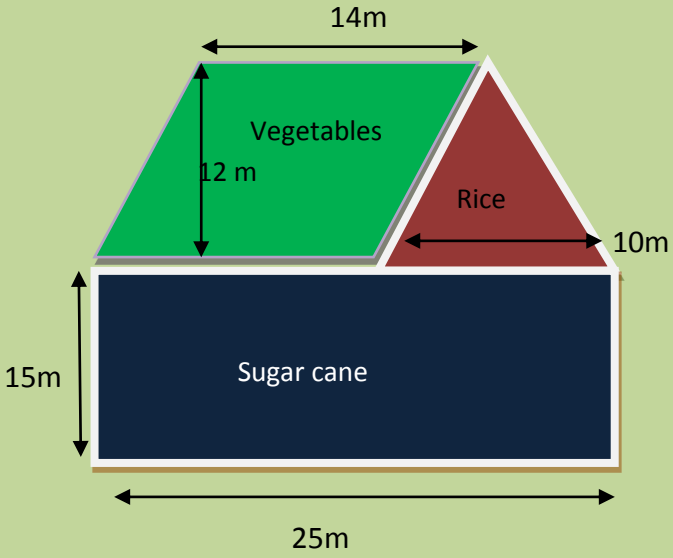
c.



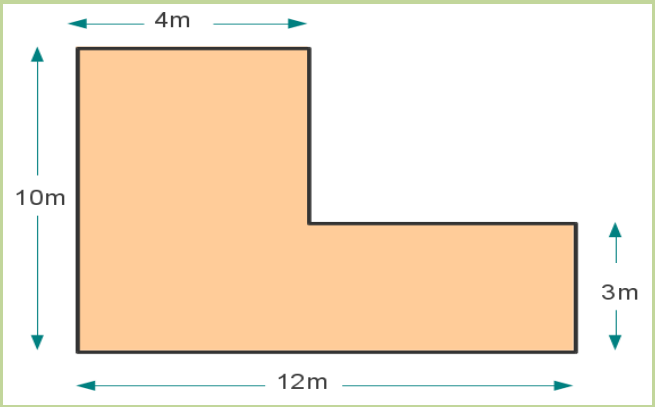
d.



2. Pajili's vegetable garden is shown on the right hand side.
   Use the measurements shown to calculate the total area of his
   Vegetable garden. The measurements are not to scale.

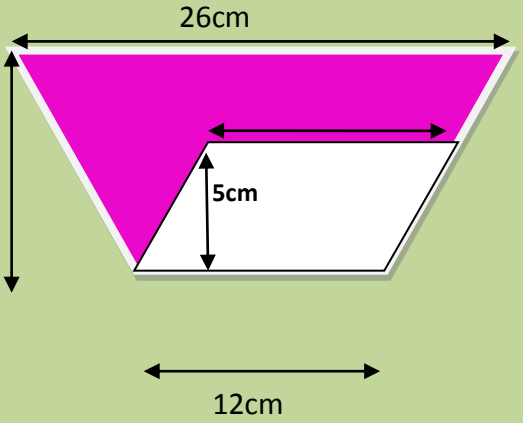


3. Calculate the area of this shape.

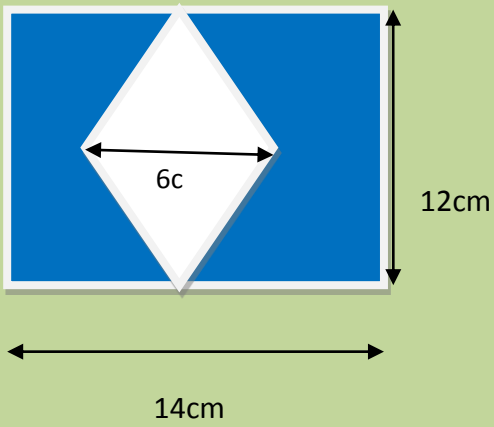


4. Find the area of the shaded region on these shapes.

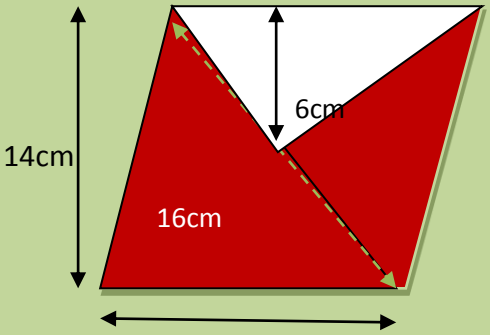
a



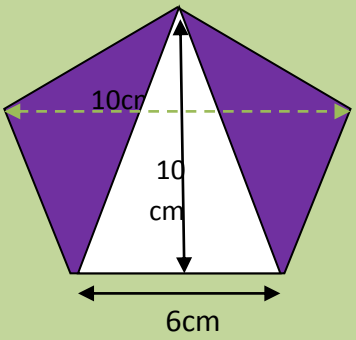
b



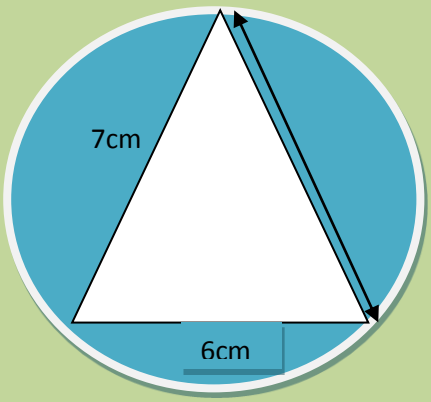
c.



d.



5. Calculate the shaded area. Use $\pi = \frac{22}{7}$ and radius = 4 cm



SURFACE AREA

Solid shapes are all around us. **Solid shapes are 3 dimensional (3D) shapes**. They have **length, breadth** and **depth or height**. Solid shapes which have only polygons for their faces are called **polyhedra.**

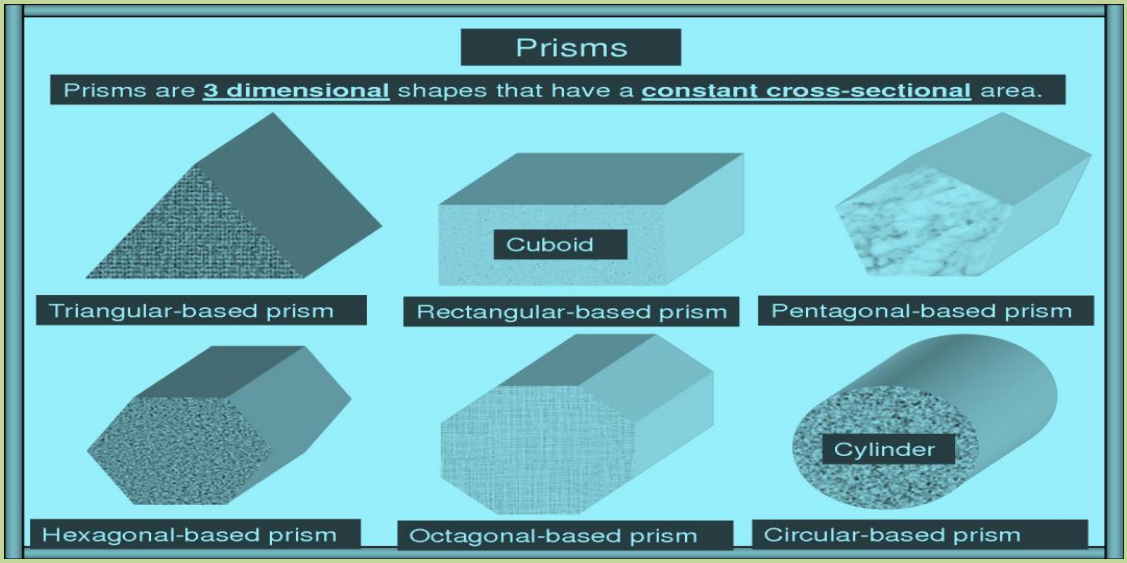
Group Activity.

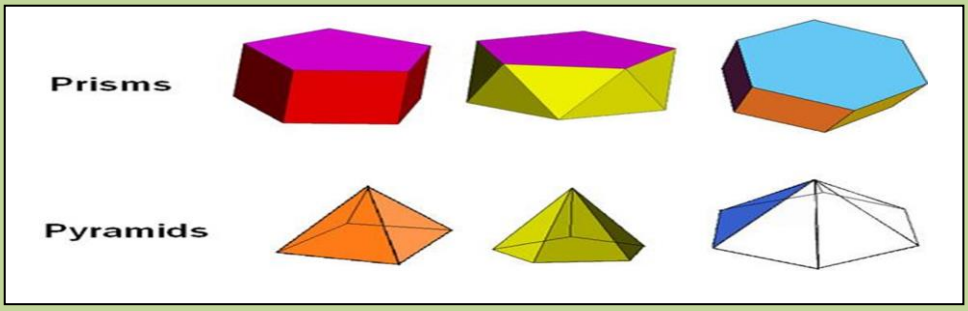
Use the Dienes blocks to find the surface area of each face of each piece,

Name the piece of Dienes Block	Total Surface Area
Cube	
Stick	
Flat	
Block	

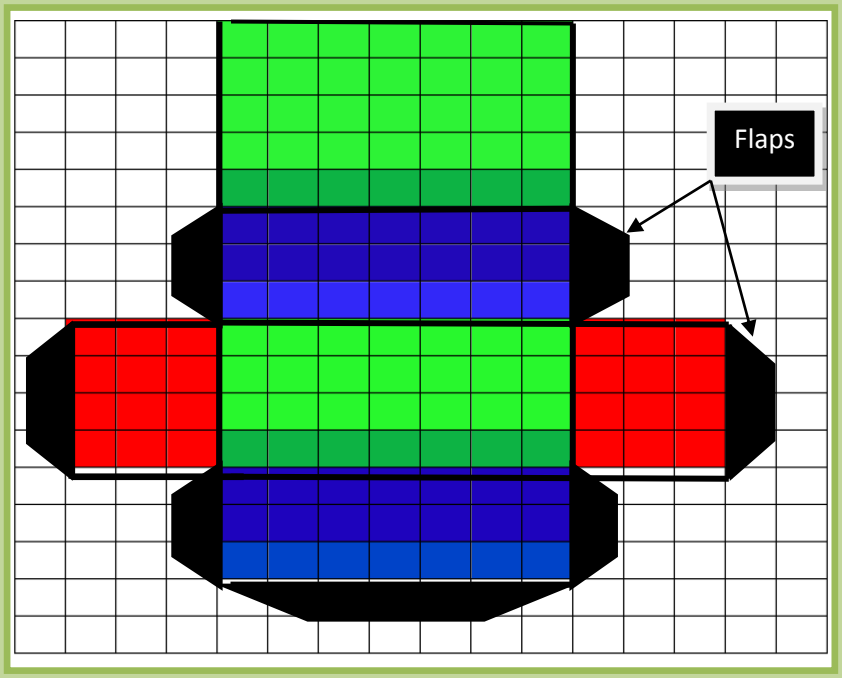
Solid shapes such as cube and cuboids are called ***prisms***. All prisms have a special pair of parallel faces.

Pyramids are solid shapes that have triangles for faces and a polygon for a base. They are named according to the shape of their base.

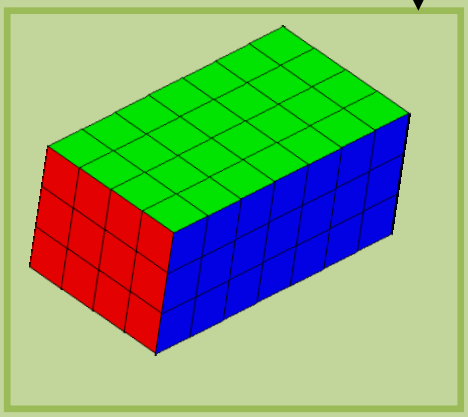




Making Nets for solid shapes.



Rectangular

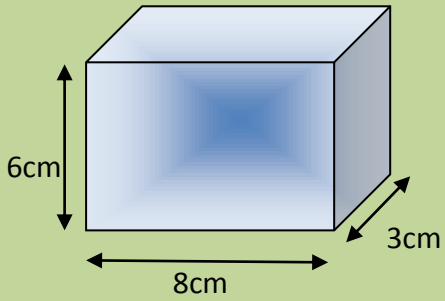


(a) Find the area of each face.

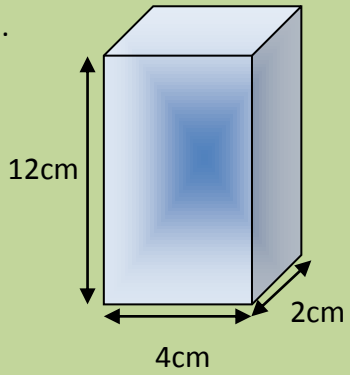
(b) Calculate the surface area of this rectangular prism.

Draw the net of these shapes and calculate their surface area.

a.



b.



To find the surface area of a solid means to find the sum of the areas of all the faces which surround or make up that solid?

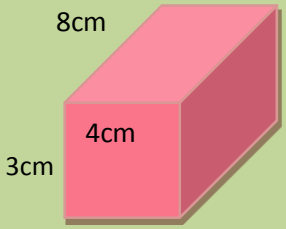
Example: Find the surface area of the rectangular prism shown on the right.

Area of Front and Back : $4 \times 3 = 12cm^2 \times 2 = 24cm^2$

Area of Top and Bottom: $4 \times 8 = 32cm^2 \times 2 = 64cm^2$

Area of Sides : $8 \times 3 = 24cm^2 \times 2 = 48cm^2$

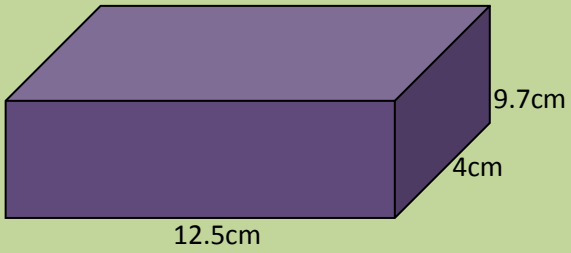
Total Surface Area: = $136cm^2$



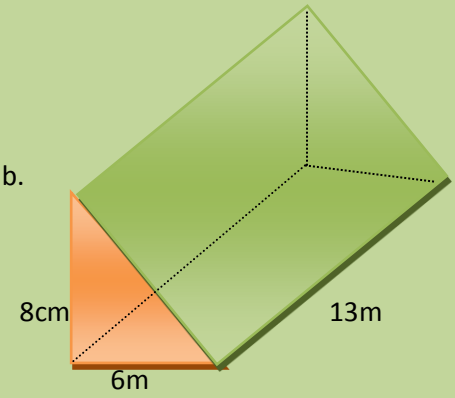
Exercise

1. Find the total surface area of these shapes

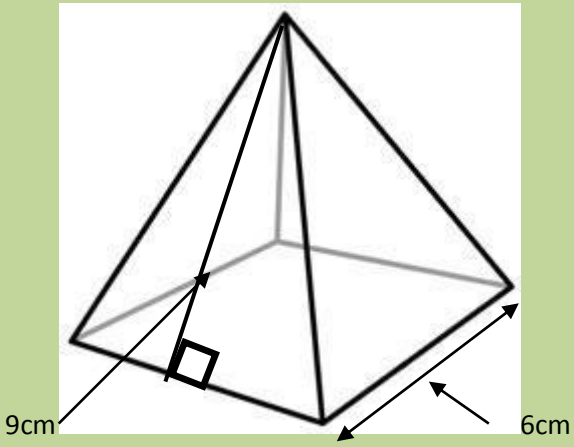
a.



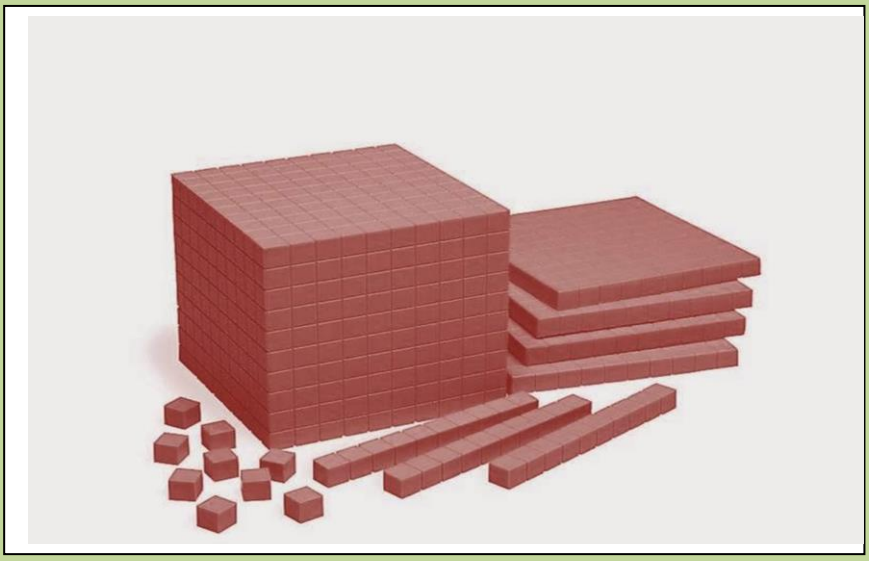
b.



2. The diagram below shows a square pyramid. Use the measurement shown on the diagram to calculate the total surface area of the shape.



3. Use the **cube units** to find the total surface area of these figures.  Cube unit



VOLUME /CAPACITY

Achievement Indicator:

- Work out any volume and capacity using basic mathematical formulas.
- Measure and compare capacities using standard unit[s] e.g. 450ml,110Litres

Volume

The **volume** of a solid shape or a 3Dimensional **(3D)** figure is the amount of space it occupies. To measure volume we use **cubic units**

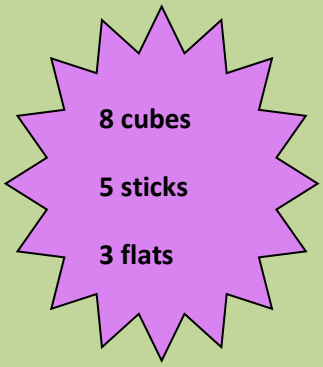
Consider a cube from the Dienes block. It is 1 cm long, 1cm wide, and 1 cm in height. The volume of a cube is **1cm^3**. The space it takes up is 1cm^3

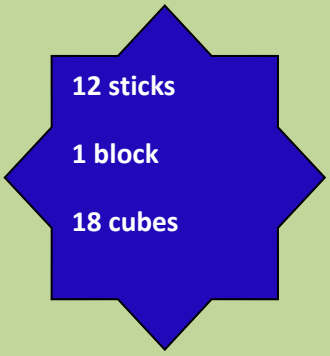
Group Activity:

1. Use the Dienes blocks to find the volume of the: **use the cube as 1cm^3**

   (i) **Stick** (ii) **Flats** (iii) **Block**

2. Find the volume of the following collections of the Dienes blocks.





Volume of Rectangular Prisms or Cuboids

We find the area of the **base- (l x w)** and then we multiply that area by the **height**.

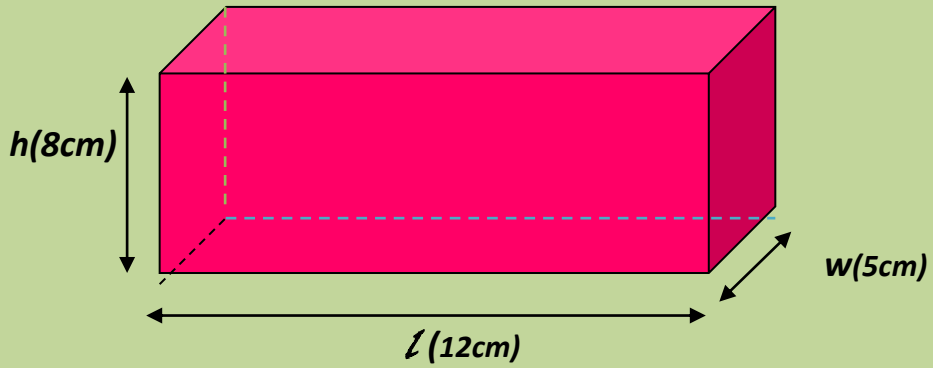
So Volume = Area of base x height

= (l x w) x h

= (12cm x 5cm) x 8cm

= 60cm x 8cm

= **480cm^3**



Volume of cuboid = (length x width) x height

V = (*l x w) x h*

Volume of Triangular Prisms

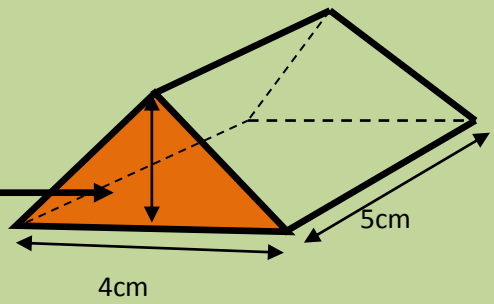
The volume of any prism can be calculated by finding the area of the cross-section and using the relationship:

Volume of prism = Area of cross-section x height

= ($\frac{1}{2}$ base x height) x h

= ($\frac{1}{2}$ x 4 x 3) x 5

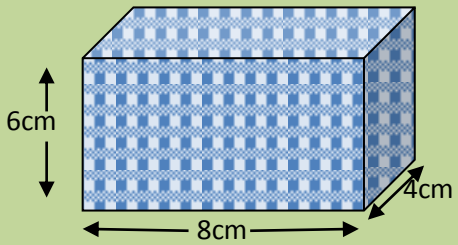
= 30cm^3



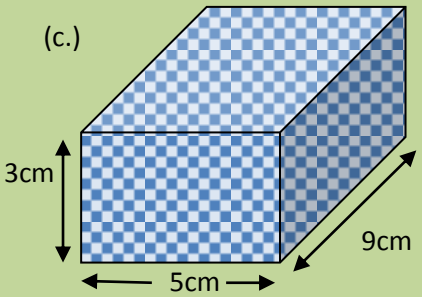
Exercise

1. Find the volume of these rectangular prisms.

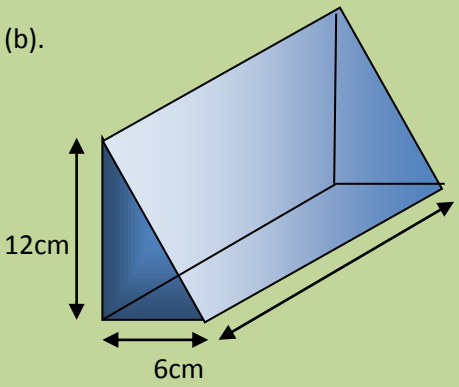
(a.)



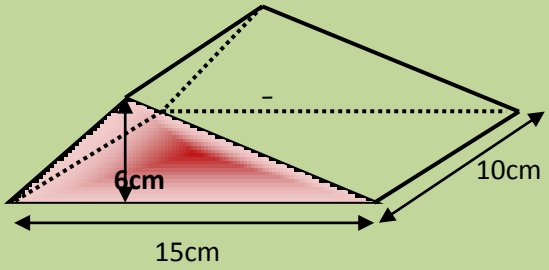
(c.)



(b).



(d)

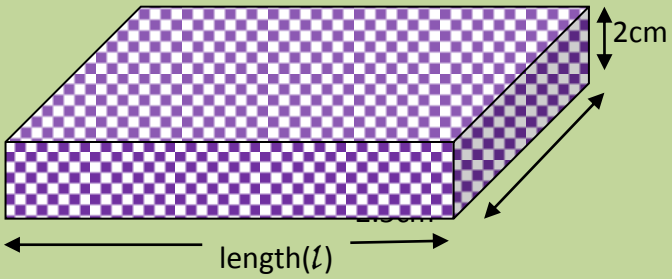


2. The diagram shows a rectangular prism. Find the length of the Prism if the volume is:

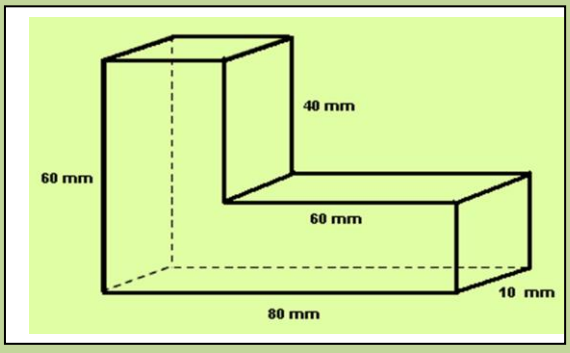
(a) $45cm^3$

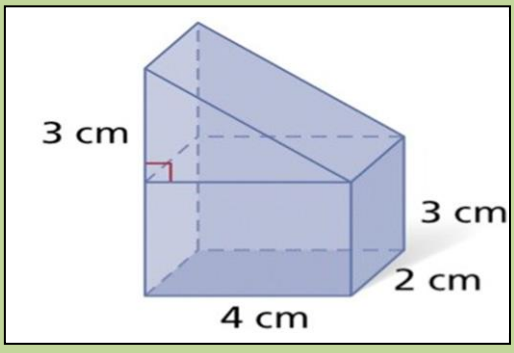
(b) $60cm^3$

(c) $20cm^3$

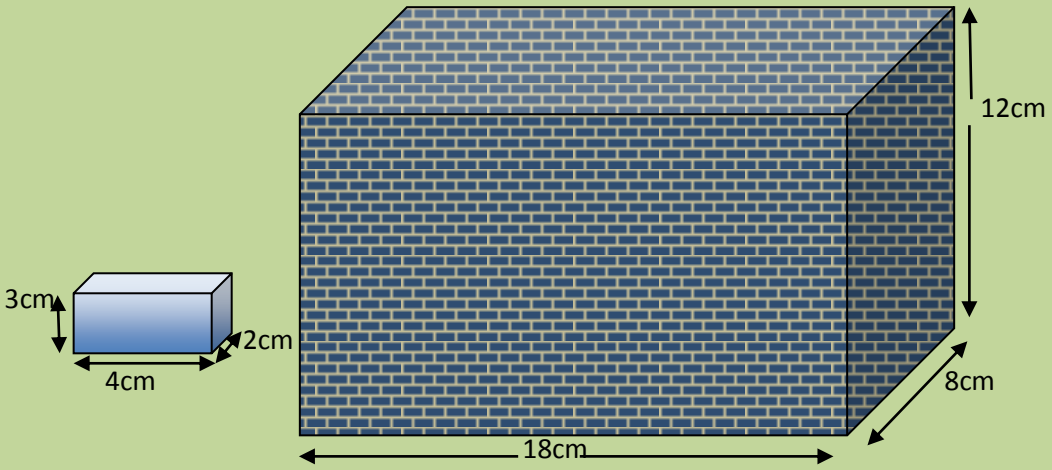


3. Find the volume of these composite shapes.



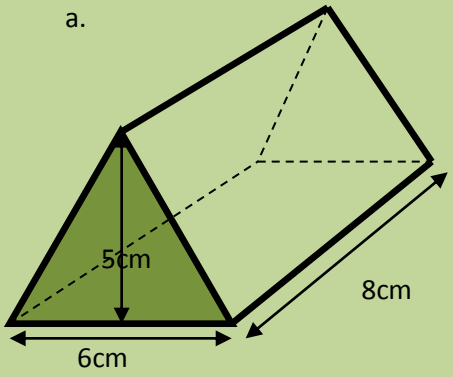


4. The dimensions of two boxes are shown below. How many small boxes will fit into the big box?

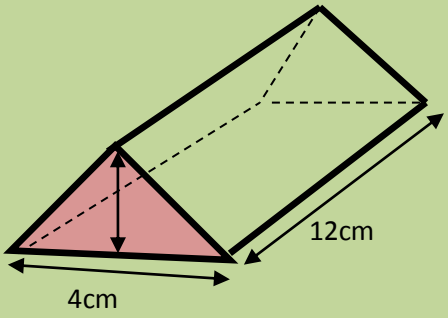


5. Find the volume of these triangular prisms.

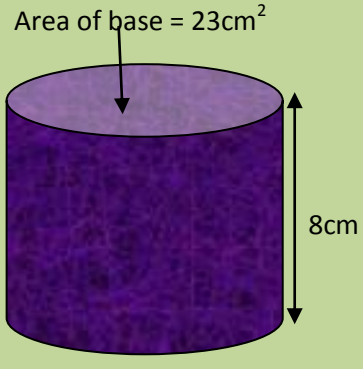
a.

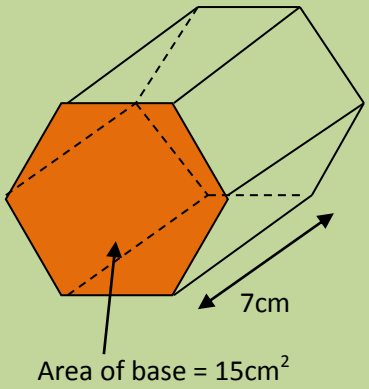


b.



6. Find the volume of the following prisms.





Capacity

Achievement Indicator

a. Work out any volume and capacity using basic mathematical formulas
b. Measure and compare capacities using standard unit[s] e.g. 450ml, 110 litres etc

Capacity is the amount of something a container can hold. It is a measurement similar to volume in that they both deal with 3-dimensional shapes. Capacity is related mainly to liquid measurement and the basic unit is *litre.*

$1cm^3$ = 1 ml

1litre = 1000ml

Exercise:

1. Convert each of the following to the unit given in brackets.

   a. 7L (ml)

   b. 69 500mL (L)

   c. 4 587mL (L)

   d. 18.7 L (ml)

   e. $6\frac{1}{2}$ L (ml)

   (f) $7\frac{1}{4}$ L (ml)

2. Find the total of the quantities below, giving your answer in the units written in brackets.

   a. 3.4 L + 7.5 L (ml)

   b. 6.8 L + 550 mL (L)

   c. 20 L + 13.51 L (ml)

   d. 35 L + 19 500ml (mi)

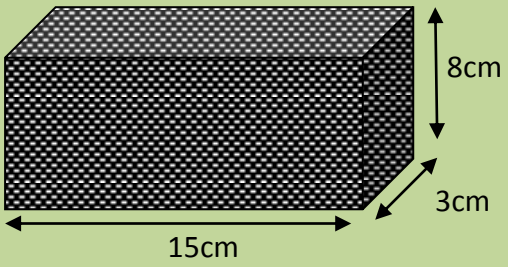
   e. 54.4 L + 25 000 mL (L)

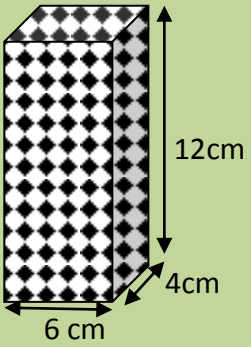
   f. 2.3 L + 3.2 L + 3450 ml (L)

3. Use five (5) different containers to estimate and find their different capacities. Use the table below to help you with your findings.

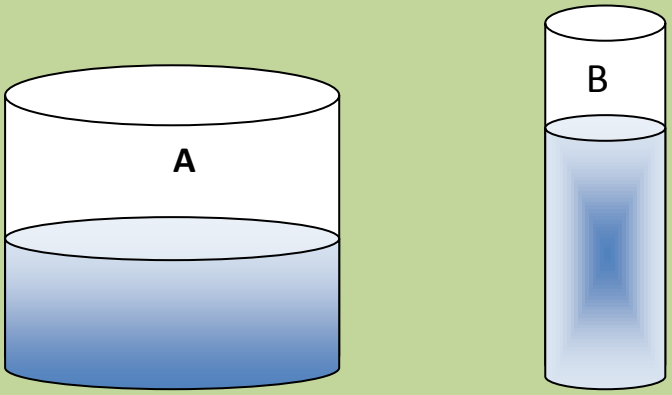
Containers	Estimated Volume	Actual Volume	Difference
1.			
2.			
3.			
4.			
5.			

4. Calculate the volume of these cuboids in cm^3 and then convert it into ml.





5.



$\frac{1}{2}$ full of water **$\frac{3}{4}$ full of water**

If tank A has the capacity of **1.8L** and Tank B has **1.6L** of water when full, then calculate the volume of water in each Tank. Write your answer in **ml.**

WEIGHT

Achievement Indicator:

a. **Measure, read and state the weight of objects using standard units**
b. **Use any operation on weight calculation in any context**
c. **Show comparison of units of weight**

Weight is measured in grams (g) or kilograms (kg).

1kg = 1000g or 1000g = 1kg

Group activity:

Use five different objects to estimate and find their actual weights using a balance.

Objects	Estimated Weight	Actual Weight	Difference

3kg changed into grams = 3 x 1000 = 1000g

250 grams changed into kg = $\frac{250}{1000}$ = 0.25kg

Exercise.

1. Convert each of the following to the unit given in brackets.
   a. 2kg (g) d. 1500g (Kg)
   b. 450g (Kg) e. 3.4Kg (g)
   c. 75kg (g) f. 1986g (Kg)

2. Find the weights of your group members and calculate the average of the group's weight.

3. Which is heavier between the two objects listed below?

a.  

car or bus

b. 

hammer or a man

c.  

puppy or a mother dog

d.  

a cruise ship or an outboard motor

4. Calculate the following weights.
   a. $\frac{1}{2}$ of 2kg
   b. $\frac{1}{4}$ of 1.6 kg
   c $\frac{2}{3}$ of 3kg
   d. $\frac{3}{10}$ of 7kg
   e. $\frac{2}{5}$ of 1.5 kg
   f. $\frac{3}{4}$ of 8 kg
5. Measure and record the weights of the following objects:
   a. a box of chalk(full)
   b. a 1 litre bottle of water
   c. an empty mug/cup
   d. a fruit
   e. a maths text book
   f. a shoe/sandal
   g. a wrist watch
   h. a wall clock
6. The weight of a ship is 980,450 kg. If 300 containers weighing 350kg each was loaded into the ship, then what would be the net weight of the ship?

7. 5 oranges weighs 1.5kg . 8 apples weighs 2kg. What would be the total weight of 3 apples and 4 mangoes?

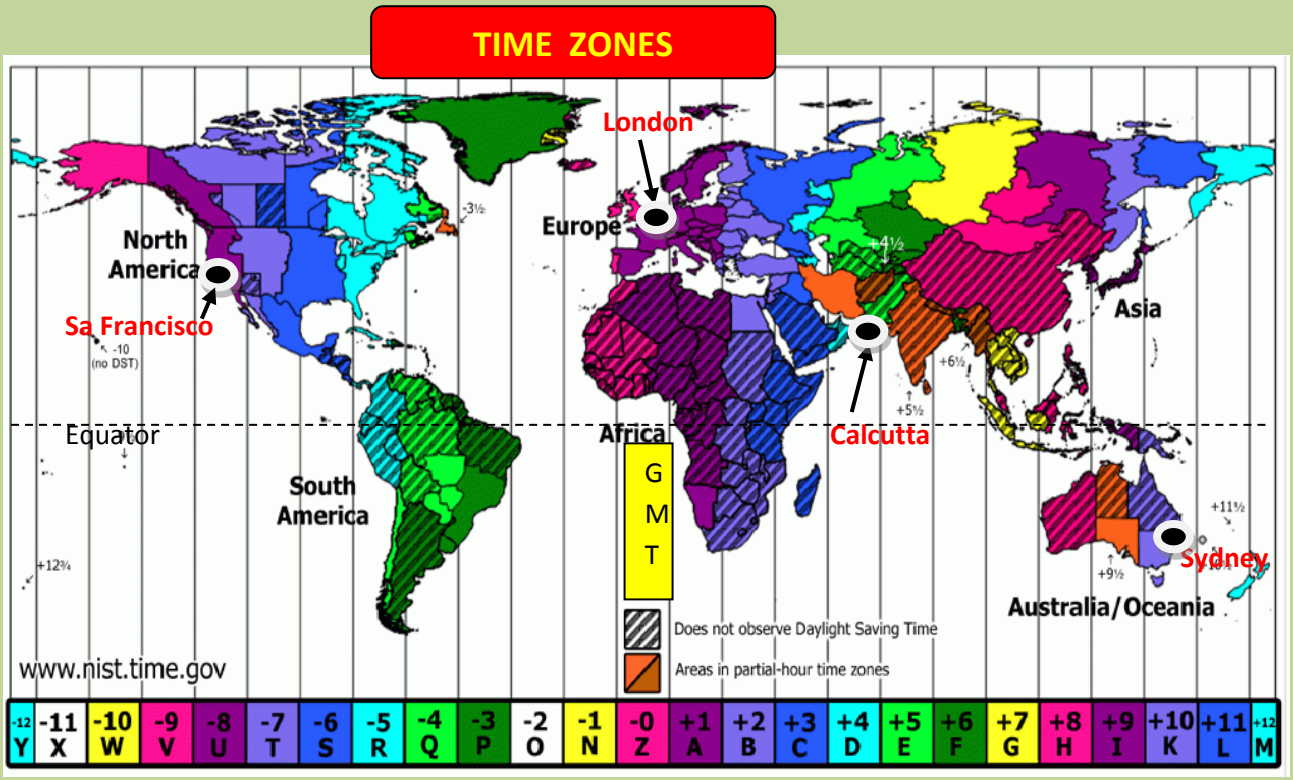
 

TIME

Achievement Indicator

- Calculate the time difference between countries
- Calculate speed, time and distance using formulas (Speed= D/T)
- Relate time to any activity taken such as recess, assembly, lunch and draw a personal daily activities

12hours ahead of Greenwich. Below is the map of the world showing the time zones.



60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

Discussion

Use the map of the world showing the zones to the answer these questions.

(a) What does this map of the world show?
(b) What does G.M.T mean?
(c) What do you call the line that separates the two time zones?
(d) What happens to your time as you move west of Greenwich?
(e) Will you gain or lose time as you move west of Greenwich?

The Table below shows the Standard Time for some countries in the Pacific.

COUNTRY	STANDARD TIME
Fiji	12h 00m ahead of Greenwich
New Zealand	12h 00m ahead of Greenwich
Tuvalu	12h 00m ahead of Greenwich
Tonga	12h 00m ahead of Greenwich
Kiribati Island	12h 00m ahead of Greenwich
Nauru	12h 00m ahead of Greenwich
Vanuatu	11h 00m ahead of Greenwich
Niue Island	11h 00m behind of Greenwich
Society Island	10h 00m behind of Greenwich.

The time zones of the world. Clocks in countries west of Greenwich are behind GMT those farther east are ahead.

The world has different time zones as shown above. The Greenwich Meridian is the line which cuts through Greenwich in London. The International Dateline is the line shows where the Time begins.

Each line is 1 hour difference.

(i) If Fiji is 2hrs ahead of Sydney in Australia, then when should we listen to the rugby match commentary on the radio if the match is to begin at 3pm in Sydney?

(ii) Calcutta in India is having a cricket match where India is playing against England. When should the fans in England listen to the match commentary if the match is schedule to begin at 5pm?

(iii) Taina is studying in Calcutta in India and her friend Meliana is studying in London. If Meliana calls Taina from London at 12pm on Saturday, at what time will Taina be receiving the call at Calcutta in India?

(iv) What will the time be when the B.B.C news from London is on the radio?

(v) What time and day will it be in the Society Island if it is 1 am on Tuesday in Fiji?

(vi) T.V New Zealand will screen live coverage of the netball match at the Multiple court in Suva between Fiji and Cook Islands at 6pm Fiji Time. At what time should the Cook Islands switch on their television sets to watch the match

Speed = Distance (D)
Time (T)

Example : A car travels a distance of 360 km at a time of 3 hrs. Calculate the car's average speed.

$$\text{Speed} = \frac{D}{T} = \frac{360\text{km}}{3\text{ hrs}} = 120\text{km/hr}$$

Exercise

1. This bus took a group of students from Suva to Nadi on an Excursion trip. It covered a distance of 380km. It took 5hrs for the bus to reach Nadi. Calculate the average speed of the bus.

2. This aeroplane left Sydney at 7.30am and arrived at Nadi International Airport at 10.30am on the same day. I covered a distance of 840km. Calculate the speed of the aeroplane.

3. The speed of an athlete in running the 400m event is 12m/sec. Calculate the athlete's time in running the 400m race.

4. A car left Suva at 2.30pm and arrived at Sigatoka at 4.30pm. It travelled at a speed of 120km/hr. Find the distance covered in the travel.

5. A bus left Suva at 7.30am and arrived in Tavua at 11.00am. It covered a distance of 350km. Fin the speed of the bus.

School Timetable

TIME	ACTIVITIES
8.00 am	**Siren for Prayer/Devotion**
8.30 am	**Lesson Begins**
10.30 am	**Recess**
10.45am	**Lesson Begins**
12.00 midday	**Lunch**
12.30 pm	**Section Duties**
12.45 pm	**Brushing**
1.00 pm	**Lesson Begins**
2.45	**School Breaks**

Discussion

(i) How long is the morning lesson
(ii) How long is the brushing time?
(iii) When shall the students get ready to go home?
(iv) How many hours do a child spends in the school in a day?
(v) How many hours is the lesson time for a day?
(vi) How long does a student spend in a day at school?

Refer to your Class Time Table to answer the following questions.

(a). How many periods of Mathematics do you have in one week?

(b). Find the total time spent on Maths for one week?

(c). Which subject uses most of the time in a week?

(d). Which subject uses the least time in a week?

Exercise

1. Here is a Timetable for a Class. Use the information to answer the questions that follows.

4L TIMETABLE TERM 3

	Monday	Tuesday	Wednesday	Thursday	Friday
9.00 9.30	Numeracy Mathematics	Numeracy Mathematics	Numeracy Mathematic s	Literacy Reading strategies	Literacy Writing Text types
9.30 10				Numeracy Mathematics	
10 10.30	Literacy Conventions Spelling and Grammar	Language Conventions	Literacy Reading strategies		Numeracy Mathematics Problem Solving
10.30 11		Literacy Reading strategies	Language Conventions	Language Conventions	
	RECESS				LUNCH
11.20 11.50	Literacy Reading strategies	Theme	CAPA	Theme	Language Conventions Spelling post test
11.50 12.20	Handwriting				Literacy literature study
12.20 1.10	Grade FMS	Community languages Native Speakers	Scripture Aboriginal Studies Dreamtime	Assembly/ House meetings	Lunch
	LUNCH				PSSA
2 3	Library	ICT	Community Languages/ Grade meeting	Literacy Writing Text types Mrs Webb	
Books home	Handwriting	Math	Reading and literacy	Theme	Writing and spelling

(a) What is the total time taken for Literacy Convention in a week?

(b) How many days is Literacy Reading strategies taken?

(c) How many lessons are taken on Friday before lunch?

MONEY

Achievement Indicator

Calculate trading of goods through selling and buying prices percentages of mark-up prices and selling price

a. Calculate hire purchase with monthly interest, repayments and better buying options for customers

b. Apply all concepts of money on Selling Price; Cash Price, compound interest and simple interest

Cost Price (CP): The amount of money paid to purchase an article
Selling Price (SP): The amount at which an article is sold

Formulas:

$CP = SP - Profit$

$CP = S.P + Loss$

$SP. = CP + Profit$

$SP = CP - Loss$

$$CP = \left(\frac{100}{100 + Gain\ \%}\right) SP$$

$$SP = \left(\frac{100 + Gain\ \%}{100}\right) CP$$

$$CP = \left(\frac{100}{100 - Loss\ \%}\right) SP$$

$$SP = \left(\frac{100 - Loss\%}{100}\right) CP$$

$$Profit\ \% = \left(\frac{Net\ Profit \times 100}{CP}\right)$$

$$Loss\ \% = \left(\frac{Net\ Loss \times 100}{CP}\right)$$

Profit = SP – CP

Loss = CP - SP

Discount:

Discount is the amount or percentage at which an item is sold at a lower price than the marked price.

E.g A shirt costs $20. If 10% discount is allowed, then what would be the actual cost of the shirt?

$$CP \times \frac{\%}{100}$$

$$\frac{20}{1} \times \frac{10}{100} = \$2$$

Actual Price = $20 - $2
= $18

Find the selling Price

A man buys car for $26,000.00. The Cost Price for the car was $30,000.00

a. Calculate Profit percent.

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

$$= \frac{4000 \times 100}{30000}$$

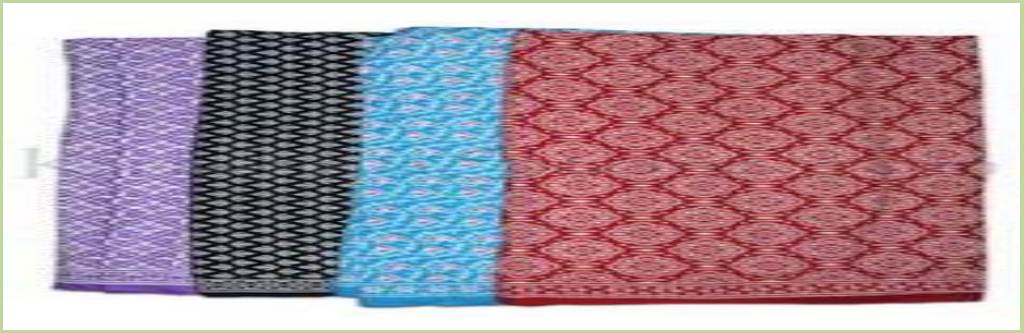
$$= 40\%$$

EXCERCISES

1. If a chair is bought for $40 and later sold with $50, Find the profit percent.

2. 5 oranges are bought for $4.00 and later sold at $0.10 each . Find the Loss percent.

3. By selling 45m of cloth, a merchant gains the CP of 15m. Find the Gain percent.



4. A shopkeeper bought 300 apples at 80c each. 30 apples got rotten and the remaining were sold at the market for 20c each.
   a. Find the buying price.
   b. Find the selling price.
   c. Find the gain or loss percent.

5. The following items are displayed in a shop. For each item, calculate

(i) the discount

(ii) the actual price

a.

b.

c

d.

6. The following items are sold on Sale during the Suva On Sale week. Find the percentage discount.

a

b.

Hire Purchases:

Jack Polly wanted to buy a double bed from Courts. The Cash Price is $750.00 but he can pay $200.00 deposit and pay $35.00 monthly instalments for 2 years.

If he takes the bed for monthly instalments, how much would he have to pay altogether for the bed after 2 years?

$35 x 24months = $840.00 + $200 (deposit)

= $1040.00

How much would he have saved if he bought it on cash?

$1040.00 - $750.00 = $290.00

Exercise

1. Mrs Ratu bought a Twin –Tub Washing Machine from M.H Homemaker in Suva. The washing machine's Cash Price is $650.00. She paid a deposit of $250.00 and agrees for a 24 monthly payments of $25.50 per month.
    a. Calculate the monthly instalment of 24 months.
    b. How much would she have to pay altogether for the Washing Machine?
    c. How much could she save if she had bought in cash?

2. Mr Raymond bought an L.G 24 inch T. V screen from Courts. He paid cash for the T.V which is $1270.00.
   How did he save if he had bought in instalment?

3. The Cash Price for a 5 piece dining table is $790.00 The deposit is $120.00 with $24.00 monthly payments for 3years.
    a. Calculate the total amount used for monthly payments?
    b. How much could be saved for buying in cash?

4. Mr Zack Peters bought this car from Sakura Car Dealer in Samabula. He bought it by paying 10% of the cash price and agrees for a monthly payments of $450 per month for 5 years.

   Calculate the total amount of money he pays for the car after 3 years.

5. Calculate the amount you can save by paying cash for this Tablet.

BETTER BUYS

These two advertisements were shown in the newspaper.

3 Shirts for $66

4 Shirts for $80

Which one is cheaper to buy?

Three Shirts – One Shirt cost - $66 ÷ 3

= $22 each

4 Shirts – One Shirt cost - $80 ÷ 4

= $20 each

Shop B is cheaper.

Exercise.

1. Calculate which of the following shops gives better price.

a.

Shop K

4 L Cooking Oil

$13.80

Shop M

2 L Cooking Oil

$8.20

b.

Top Shop

3 for $2.40

Corner Shop

2 for $1.50

2. Mr Etuate Toutou wanted to buy some bags of potatoes for a family function at home. He visited three supermarkets and he got these prices.

Which one do you think will be better for him to buy?

Simple Interest

Mr Bajiu wanted to buy an outboard motor for his travelling and fishing trips. The cost of the outboard motor with the engine is $25,000.00.

He borrowed the money from the bank which gives an interest of 6% per annum for 5 years.

Calculate the **Simple Interest** = $\frac{\textbf{Principle x Rate x Time}}{\textbf{100}}$

$= \frac{25{,}000 \times 6 \times 5}{100}$

$= \$7{,}500.00$

The Total amount he has to pay the bank after 5 years:

$25,000.00 + $7,500.00 = $32,500.00

Exercise

1. Mr Bravo took a loan of $12 00.00 from Westpac Bank. The bank gives an interest of 5% per annum for 3 years.
   a. Calculate the Simple Interest.
   b. What would be the total amount of money Mr Bravo had to pay back to the bank?

2. City Carz dealers is selling this car.

   Mr and Mrs Cama took a loan from BSP bank to buy this car. The bank gave 7% interest per annum for 5 years.

   Calculate the total amount of money Mr and Mrs Cama will have to pay back to the bank after 5 years.

3. Mrs Sorovaki wants to travel to Australia. She had to borrow $5,500 from the bank for her travelling expenses.
   The bank gave her the amount of money with and interest of 5% per annum for 3 years .

   a. Calculate the Simple Interest.
   b. What would be the total amount Mrs Sorovaki pays to the bank?

M4 : GEOMETRY

YEAR 8

SHAPES

Achievement Indicator:

a. Identify and name correctly the number of sides of every 2D shapes.
b. Draw and name the basic 3D shapes correctly
c. Classify and name 3D shapes.
d. Identify some 2D and 3D shapes around them

2-Dimensional figures such as – triangles, square, rectangle, circle, etc

3-Dimensional figures such as – cube, cuboid, cylinder, pyramid, cone, sphere, etc

3-Dimensional figures are solid figures. These have edges, faces, vertices and nets.

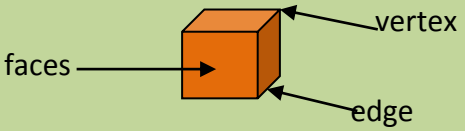
Edge: An edge is formed when two faces of a solid meet. It is an outside limit or boundary of an object or a surface.

Face: Face is a plane surface enclosed by an edge or edges.

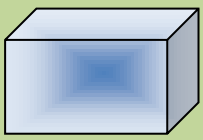
Vertex: A point, at which two or more faces or edges meet, is known as vertex. It is also referred to as a corner.

Net: Net is the shape that can be cut out of a flat piece of paper or cardboard and folded to make the 3-D shape.

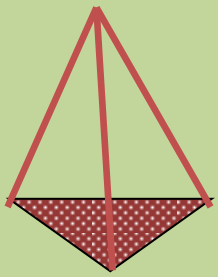
1. **Cube :** A cube is made up of 6 faces
   E.g. dice, sugar cubes, etc
   It has **6 faces,** and **8 vertices** and **12 edges**



2. **Cuboid:** It is a rectangular solid.
   e.g. brick, match box, a book etc



3. **Tetrahedron** (**A Triangular Pyramid**)
   A Triangular pyramid (tetrahedron) is a solid shape which stands on a triangular base. It tapers to a point called the vertex of the pyramid.
   It has 4 vertices, 6edges, 4 triangular faces



4. **Square Pyramid.**

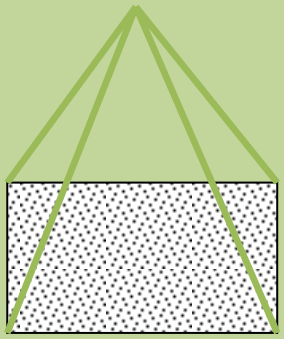
A square pyramid is a solid shape which stands on a square base. Its side faces are triangles having common vertex called **vertex of pyramid**

It has 5 vertices, 8 edges and 5 faces(4 triangles and a square)

5. **Rectangular Pyramid.**

A rectangular pyramid is a solid which stands on a rectangular base. It also tapers to a point. Its faces are triangles having common vertex of the pyramid.

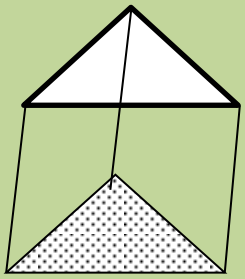
It has 5 vertices, 8 edges and 5 faces(4 triangles and 1 rectangle)



6. **Prisms: (A triangular prism)**

A triangular prism is made up of two Triangles at each end and 3 rectangles

It has 6 vertices, 9 edges and 5 faces.(2 triangles and 3 rectangles)



To Summarise.

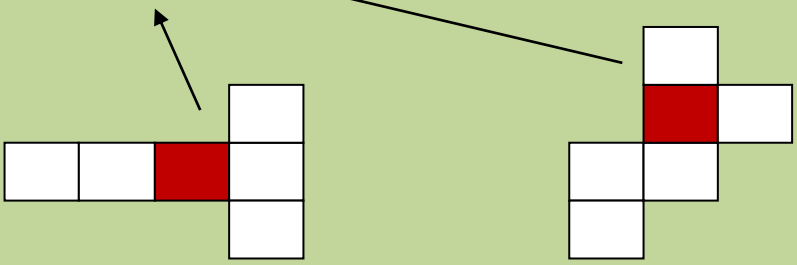
SOLID	N° of Faces	N° of Vertices	N° of Edges
1. Cube	**6**	**8**	**12**
2. Cuboid	**6**	**8**	**12**
3. Triangular Pyramid	**4**	**4**	**6**
4. Square Pyramid	**5**	**5**	**8**
5. Rectangular Pyramid	**5**	**5**	**8**
6. Triangular Prism	**5**	**6**	**9**

Nets.

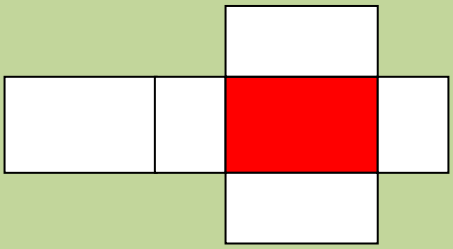
A net of a 3-D figure is the shape that can be cut out of a flat piece of cardboard or paper and folded to make the 3-D figure.

In other words this is simply combining 2-D shapes to form 3-D shapes.

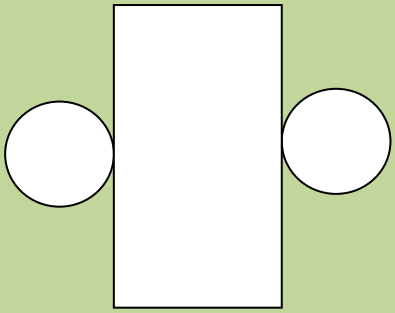
Net of a Cube



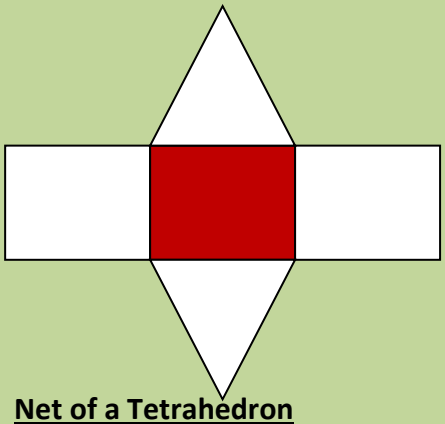
Net of a Cuboid



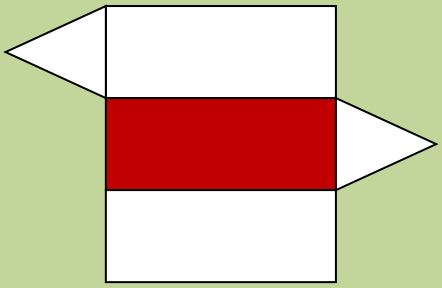
Net of Cylinder



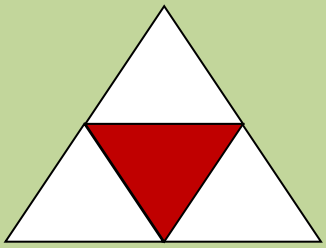
Net of Triangular Prism



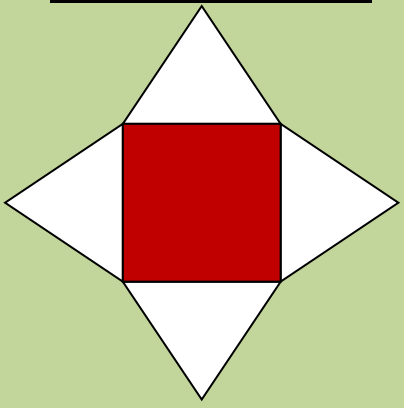
Net of Triangular Prism



Net of a Tetrahedron



Net of a square Pyramid



Exercise

1 . Fill in the blanks.

a. The other name of tetrahedron is _____.
b. A square pyramid has _____ vertices.
c. A solid figure which has 6 vertices, 9 edges and 5 faces is called _____.
d. A rectangular pyramid has _____ faces.
e. A solid which consist of three rectangular and two triangular faces is known as _____.

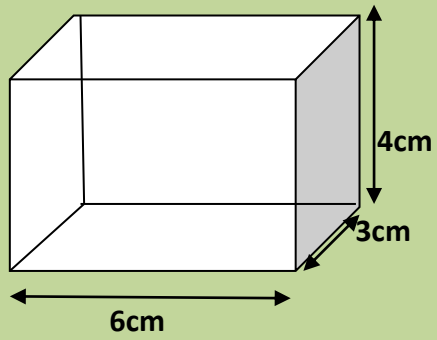
2. Draw , cut, colour and paste the following 2-D shapes.

a. pentagon b. nonagon c. decagon

d. hexagon e. octagon

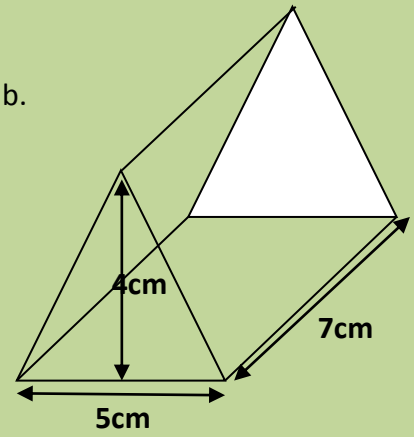
3. Draw the net of the following 3-D figures.

a.



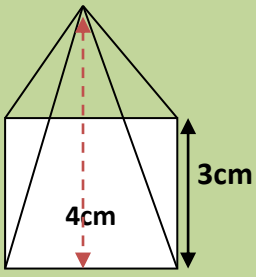
Cuboid

b.



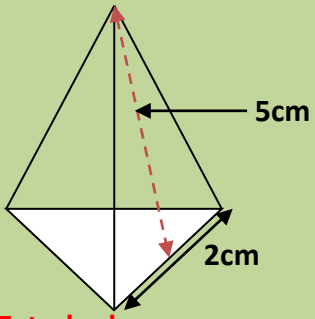
Triangular Prism

c.



Square pyramid

d.



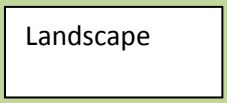
Tetrahedron

4. Name at least 5, 2-D and 3-D shapes. Fill in the table below.

In the Classroom/School		At Home/Community	
2D Shapes	**3D Shapes**	**2D Shapes**	**3D Shapes**

5. Construct 2 different cylinders using A4 size paper.

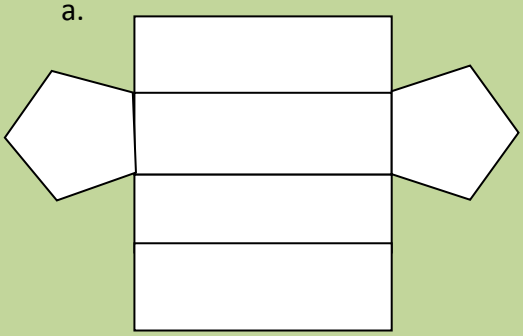
(i) Cylinder A with portrait layout of A4 paper (ii) Cylinder B with landscape layout.



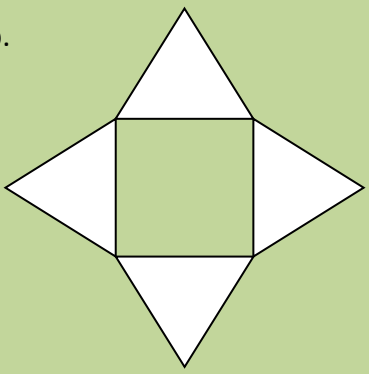
a. Measure the height and the circumference of each cylinders.
b. Estimate which of the two cylinders has more volume.

7. Identify which 3-D figure fits on the nets given below.

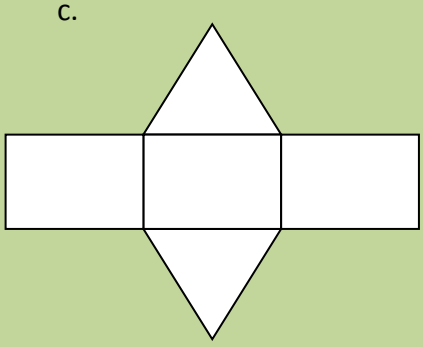
a.



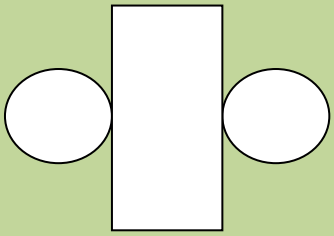
b.



c.



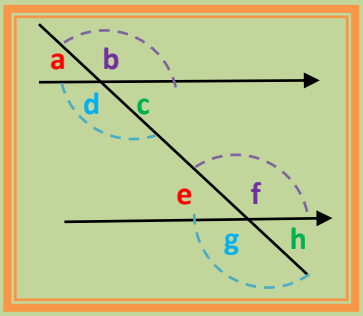
d.



Angles, Lines and Circles.

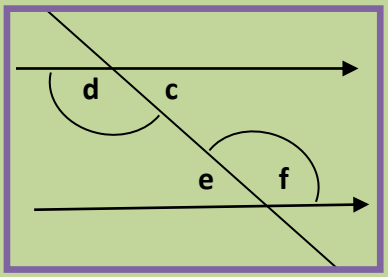
Corresponding Angles are Equal

a = e b = f d = g c = h



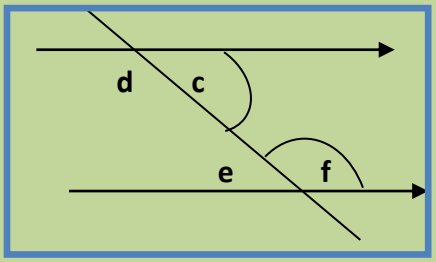
Alternate Angles are Equal

d = f c = e



Cointerior angles are Supplementary Angles

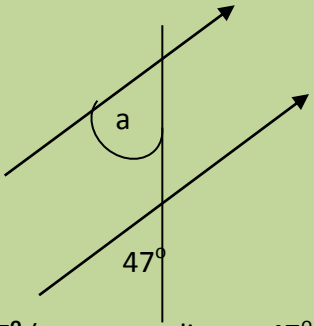
d + e = 180° c + f = 180°



Examples:

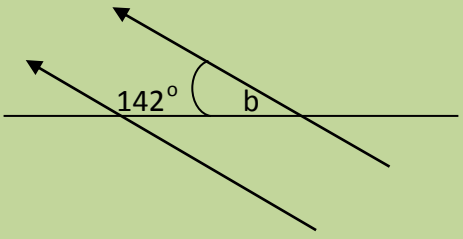
Find the values of the unknown pronumerals in the diagram below.

a.



∠a = **47°** (corresponding to 47°)

b.

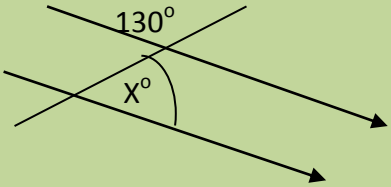


∠ b + 142° = 180° (b is cointerior to 142°) = **38°**

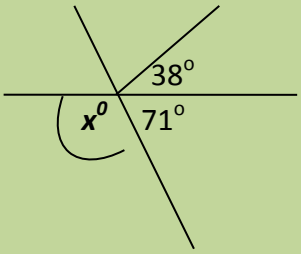
Exercise:

1. Find the value of the pronumeral in each case.

a.



b.



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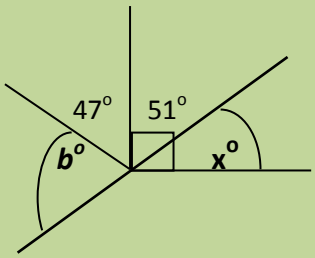

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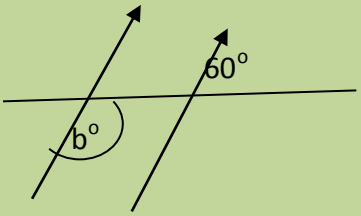

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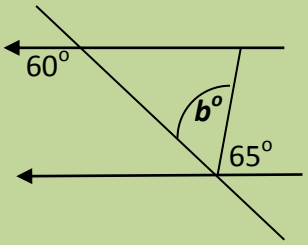

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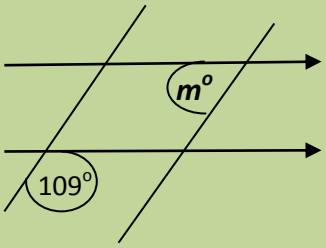
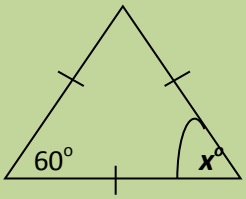


2. Find the size of x^o in the following diagrams.

a.



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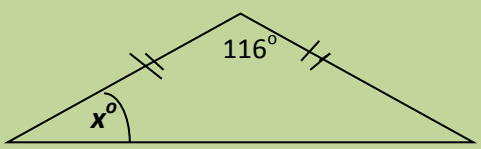

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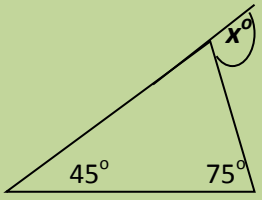
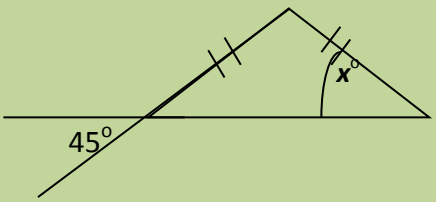
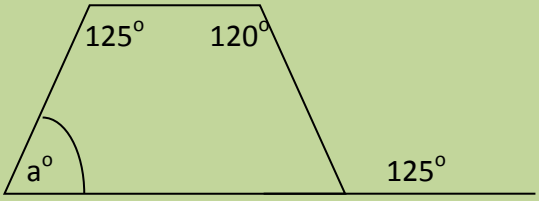


d.

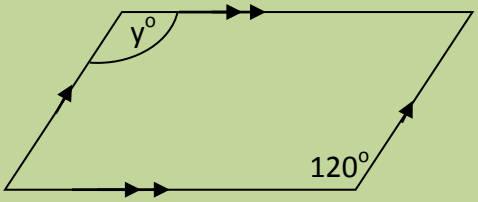


3. Find the size of the pronumeral in each case.

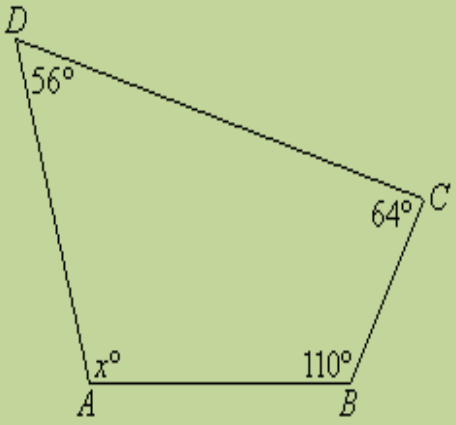
a.



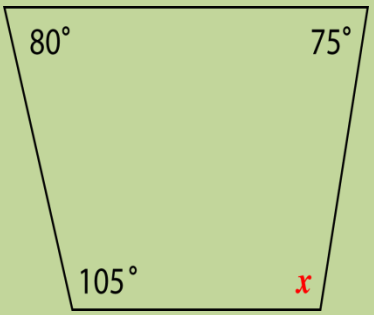
c.



b.

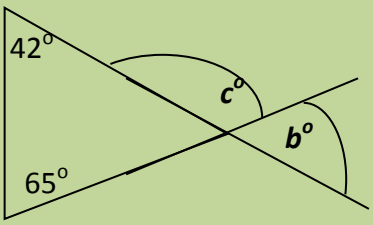


d.

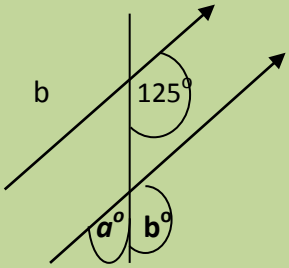


4. Find the missing angles.

a.



b

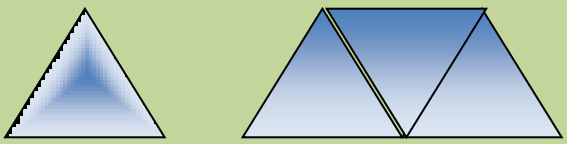


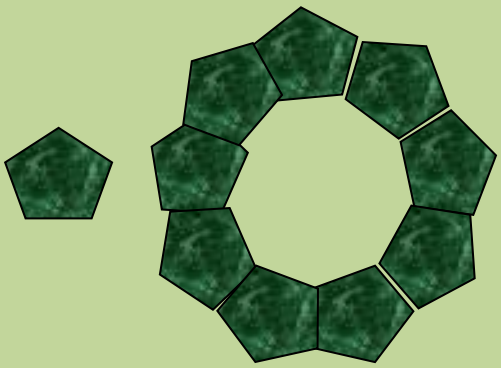
<u>Group Activity.</u>

Using 2D and 3D shapes to form patterns.

Examples.

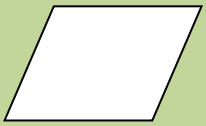
Use the following 2Dshapes to make patterns.

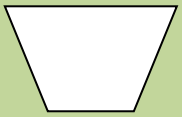


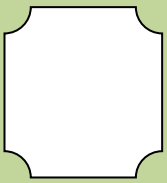


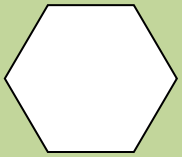
Group Activity

Use these 2D shapes and 3D solids to make patterns and create new shapes or solids.

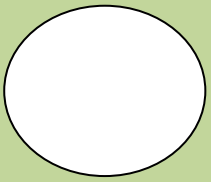
a. 

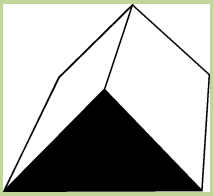
c. 

b. 

d. 

e. 

f. 

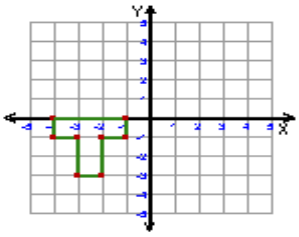
g. 

Reflections

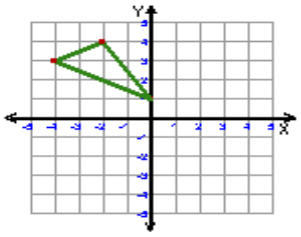
A reflection is a **flip** over a line.**You can try reflecting some shapes about different mirror lines here:**

Reflections

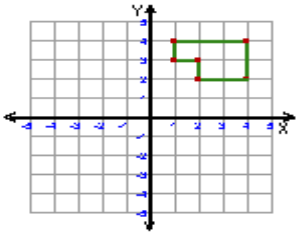
1) Reflection: Across Line y = -x



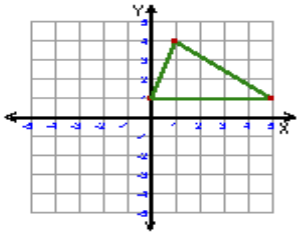
2) Reflection: Across Line y = x



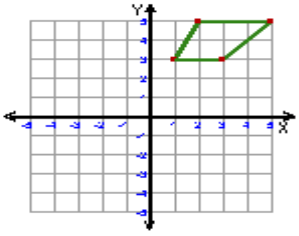
3) Reflection: Across the line x = 1



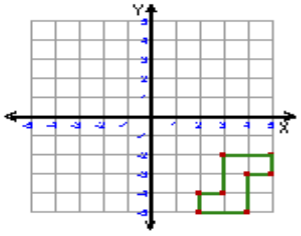
4) Reflection: Across the y-axis



5) Reflection: Across the line y = 2



6) Reflection: Across the x-axis

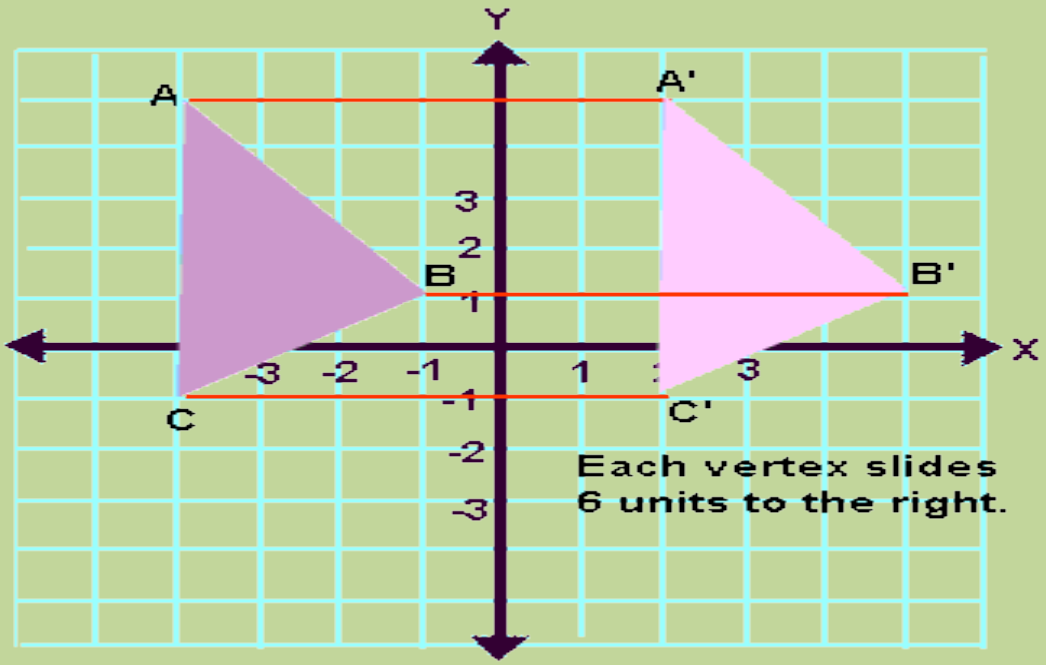


Translations

A translation "slides" an object a fixed distance in a given direction. The original object and its translation have the same shape and size, and they face in the same direction. A translation creates a figure that is congruent with the original figure and preserves distance (length) and orientation (lettering order). A translation is a direct isometry.

Translations in the Coordinate Plane:

In the example below, notice how each vertex moves the same distance in the same direction.

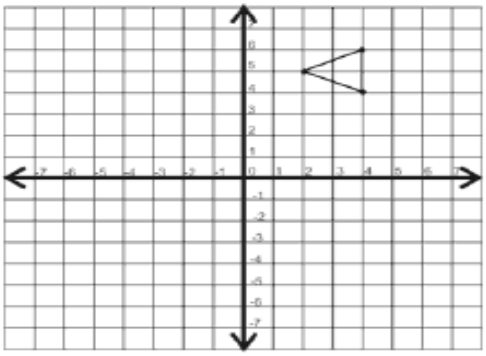


Exercise.

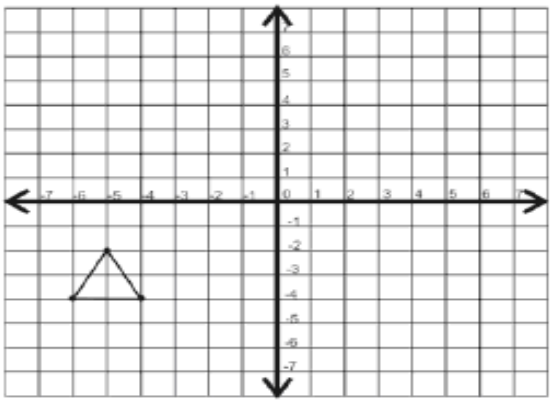
Translate Figures Worksheet

Translate the triangles in the grid based on the directions above each grid.

1. Translate triangle 4 units left and 3 units down.

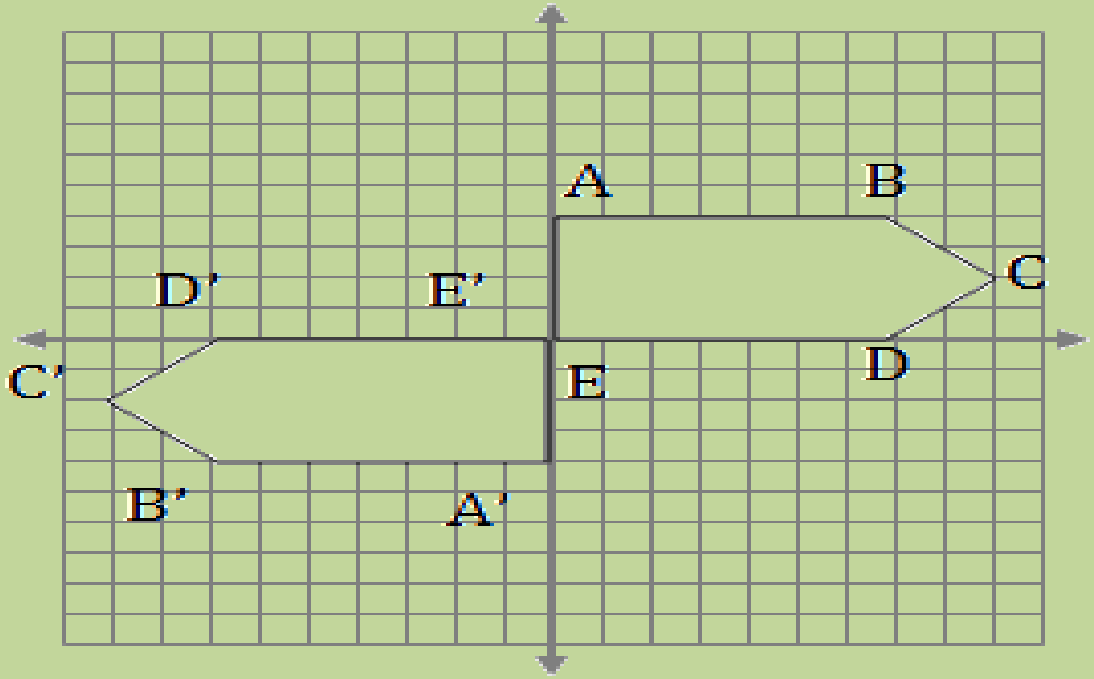


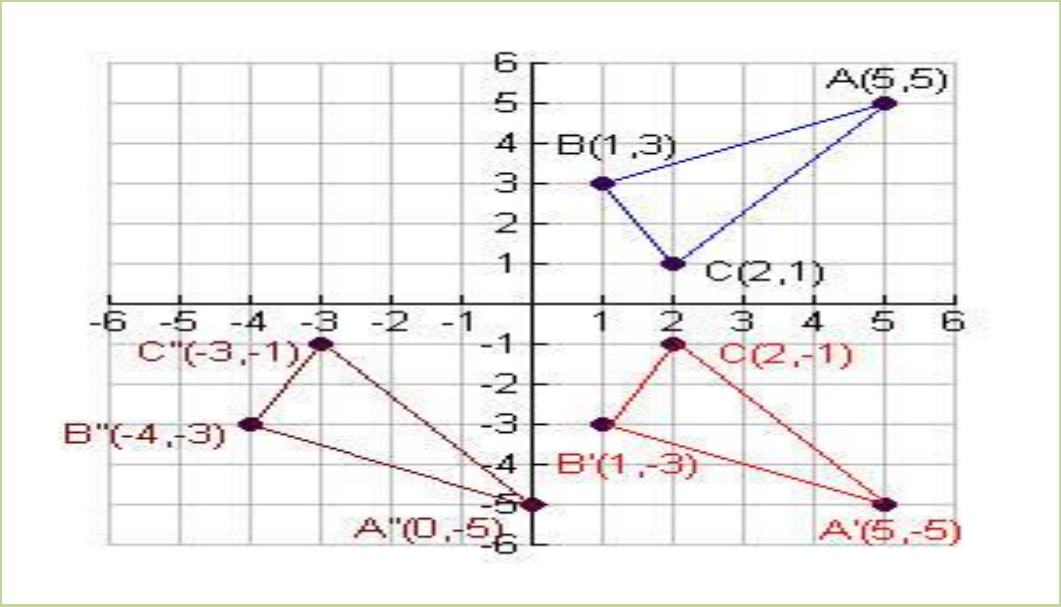
2. Translate triangle 5 units up and 6 units right.



Rotations

To rotate an object you need a center of rotation and how much you want to rotate it. By convention, positive rotations go counter clockwise, and negative rotations go clockwise.





STRAND : M5: CHANCE AND DATA

DATA REPRESENTATION AND INTERPRETATION

Achievement Indicator:

- Compute **a set of data** to determine their **range, averages** and **plot simple graphs** and **frequency tables** to determine and **interpret information** presented.

DATA- are individual observation of a ***variable.*** **A variable** is a quantity that can have a value recorded for it or to which we can assign to attribute or quality.

There are two types of Variables:

1. **CATEGORICAL VARIABLES**

A **categorical variables** one which describes particular quantity or characteristics. It can be divided into categories. The information collected is collected is called **categorical data.**

Example:

- Getting to school: categories could be – ***bus, car, taxis, boat, walking***.
- Colour of eyes – categories could be – ***brown, green, black, hazel.***

2. **QUANTITATIVE (NUMERICAL) VARIABLES**

A **quantitative (numerical) variable** is one which has numerical value and is called a numerical variable. The information collected is called numerical data

To find the **Range** of any data given = the ***Highest*** score – the ***Lowest*** score.

Range = Highest score – Lowest score

The average of a set of data can be calculated by using the relationship:

$$\text{Average} = \frac{\text{Sum of all scores}}{\text{Number of scores}}$$

Example : Timothy scored these marks in his class short test:

Mathematics:	79	English :	68
Basic Science:	90	Social Sc:	94
Health Science:	84	Vernacular:	98

a. Range = Highest – Lowest

= 98 – 68

= 30

b. Average = $\frac{\text{Sum of all scores}}{\text{Number of scores}}$

= $\frac{513}{6}$

= 85.5

Exercise:

1. Classify the following variables as categorical or quantitative.
   a. The heights of the students in Year 7.
   b. The colour of hair in a festival.
   c. The number of matches on a box.
   d. The most popular radio stations.
   e. The marks scored in a test.
2. Veronica scored the following marks in a class short test:

Maths:	85	English:	95
Basic Science:	90	Social Science:	80
Health Science :	75		

   a. Calculate the range of Veronica's' mark.
   b. Find her average mark.
   c. In which subject did she score the highest mark?
   d. In which subject mark is closer to the average mark?
3. A group of young footballers was invited to participate in a long kicking competition. The following results in metres were obtained:

55	30	51	49	58	31	32	47	41	36	40
49	69	47	43	35	49	41	45	45	46	49
30	51	35	37	23	33	68	49	49	61	48

   a. What is the longest distance in which the ball was kicked?
   b. Calculate the range and the average of the kicking competition result.
4. The following table shows the weather information from three different places in Fiji on the 17th September 2014.

Places	Hours of Sunshine	Rainfall	Temperature	
			Max	Min
Suva	7hrs	10.5mm	28°C	20°C
Nadi	13hrs	1.2mm	38°C	35°C
Labasa	11hrs	4.5mm	37°C	32°C

   a. Which place is the hottest?
   b. Which of the three places has longer days?
   c. What kind of weather was experienced in Suva?
   d. Calculate the average maximum temperature for the three places.
   e. What is the range of the hours of sunshine

FREQUENCY TABLES:

A **frequency table** is a table that displays the **frequency** for each of the categories of the data. The frequency is the number of times each piece of data occurs. Tally marks (**IIII**) are often used to help record data in the table.

Example 1

A census is taken for Year 8 of a school in the village. The method by which the students in the class travelled to school on a particular day is recorded below using the code:
Walk:(**W**), cycle(**C**), bus(**B**) car(**R**) Horse(**H**),

WCBWC BBBWB BBCHB CMCBHW RRWWH

Rearrange this information into a frequency table using a tally column.

Method of travel	Tally	Frequency
Walk	𝍸 I	6
Cycle	𝍸	5
Bus	𝍸 IIII	9
Car	II	2
Horse	III	3
	Total	**25**

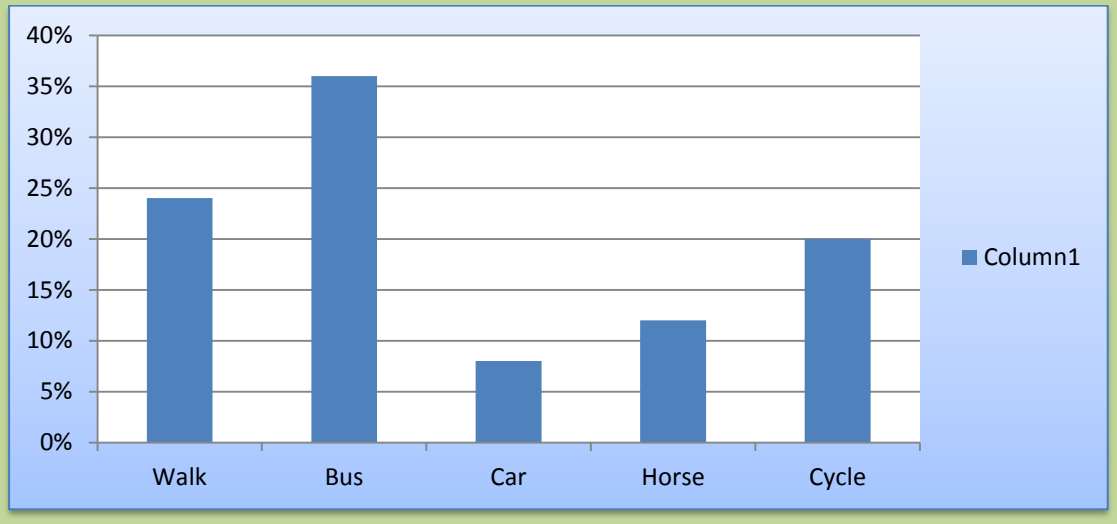
Discussion:

(i) What is the most method of travel for students in that school?

(ii) What percentage walks to school?

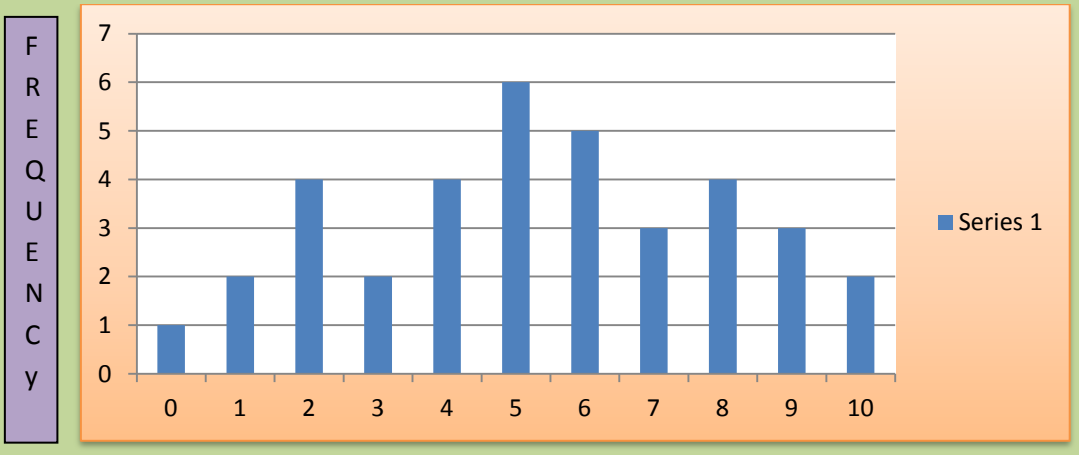
Plotting Simple Graphs To Display Data:

Bar graphs of the Method of Transport to school



Exercise

1. A class of students wrote a spelling test which was out of 10 marks. The results have been graphed on the histogram below



Scores (Spelling Test marks)

a. Which score had the highest frequency?
b. Which score had the lowest frequency?
c. How many students score 8 out of 10 marks?
d. How many students failed the spelling test?
e. How many students sat for the test?
f. What percentage of students score more than 7 marks?

2. Two dices were rolled 60 times, and throw the sum of the numbers were recorded. The results are shown below.

4	8	7	5	7	12	6	9	7	5	3	11	7	6	11
8	10	5	4	8	12	8	6	8	5	11	7	7	6	9
7	2	9	7	9	6	5	8	6	4	4	8	11	8	4
7	3	9	7	10	6	7	5	9	8	10	7	8	5	6

a. Produce a frequency distribution table for the data.
b. Draw a bar graph for the result.
c. Which score has a frequency of 8?
d. How many scores of 5 are there in the result?

3. Students in Year 8 at Nanuku Primary School sat for a Maths Test set by the Head Teacher. The marks the students gained in the test were shown below.

3	8	6	5	6	4	7	6
5	3	5	6	3	5	4	5
3	6	7	8	1	10	7	6
4	5	0	7	6	5	6	7
1	7	5	4	5	8	5	7

a. How many students did the test?
b. What is the highest mark?
c. What is the lowest mark?
d. How many students scored more than seven marks?
e. How many pupils did not score five marks?
f. Copy and complete the frequency table for the marks in the Maths Test.

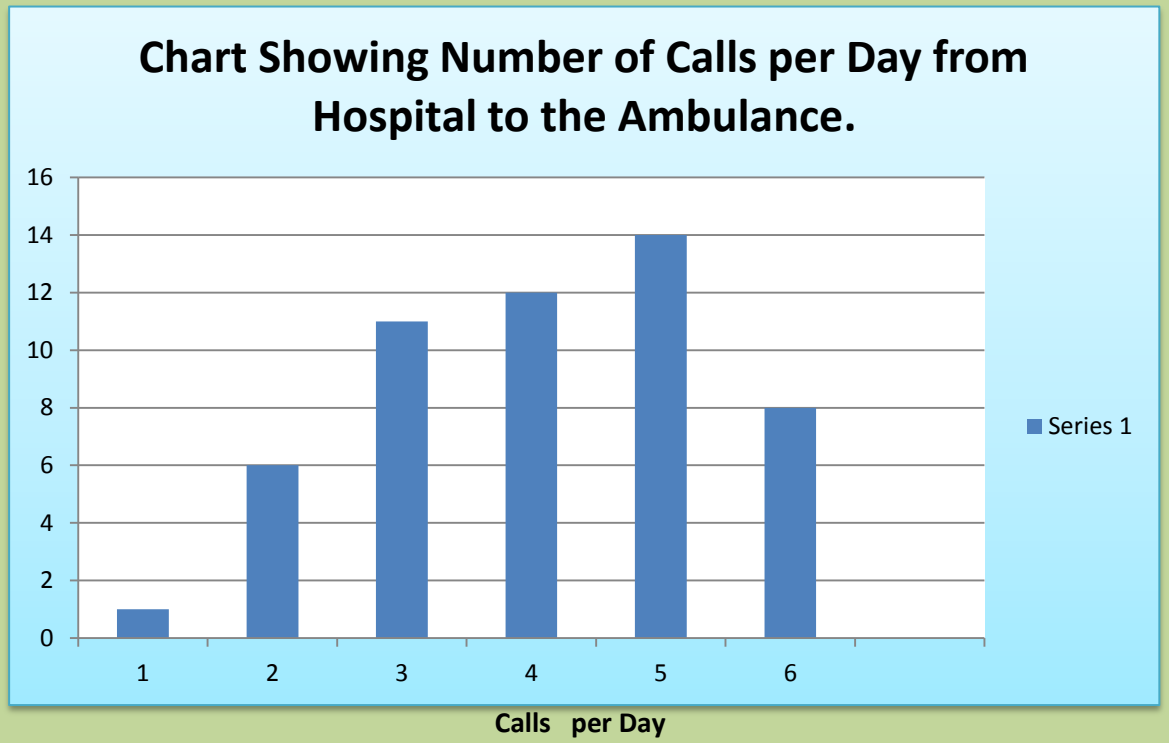
Marks Obtained	Tally	Frequency
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		

4. Here is a paragraph about Firewalkers of Beqa. Read the passage and make a frequency table of the vowels used in this paragraph.

> The Fijian walking stems from belief in legendary spirit god who passed on the gifts of resisting heat to the Sawau Tribeman . They live on the windward or southern side of the main island of Beqa.
>
> It is said that only the Sawau people can walk on the red hot stones but the tribe had been known to adopt the occasionally outsider who has then been able to perform the ceremony successfully.
>
> Firewalking performances are held on special occasions on Beqa island.

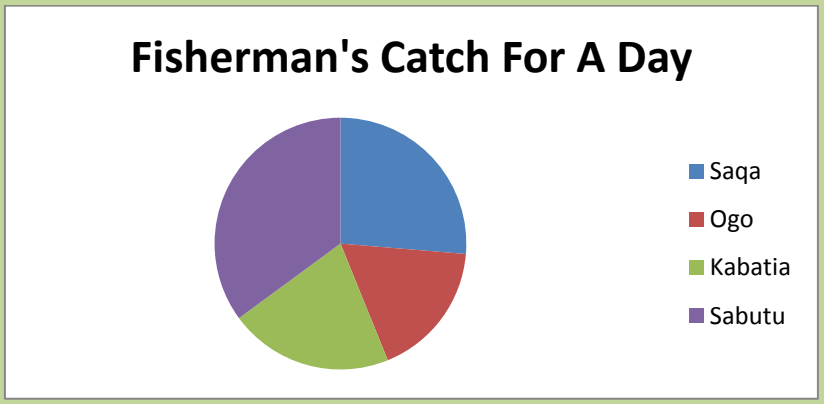
(a). Which vowel occur the most in the passage?
(b). Which vowel occur the least in the passage?

5. The bar chart below shows the number of times per day the local hospital sent out an ambulance in answer to call.



a. How many days are represented by the information?
b. On how many days were there at least 3 calls?
c. What is the range of the number of calls per day?
d. On how many days were there 5 calls?

6. A fisherman's catch was put in a pie-chart as shown below.



a. Which type of fish was most commonly caught by the fisherman?
b. Which kind of fish was caught the least?

7. There are 30 students in Year 801 in a school in Suva. These are the different places where they lived.

Lami	Vatuwaqa	Nabua	Samabula	Tamavua
4	12	6	5	3

Representing this data into a pie-chart,

e.g Lami = $\frac{4}{30}$ x 360^{o} = **48^{o}**

Calculate for the other places and represent it in a pie-chart.

8. The number of visitor arrival from 2005 to 2008 is shown below in a line graph.

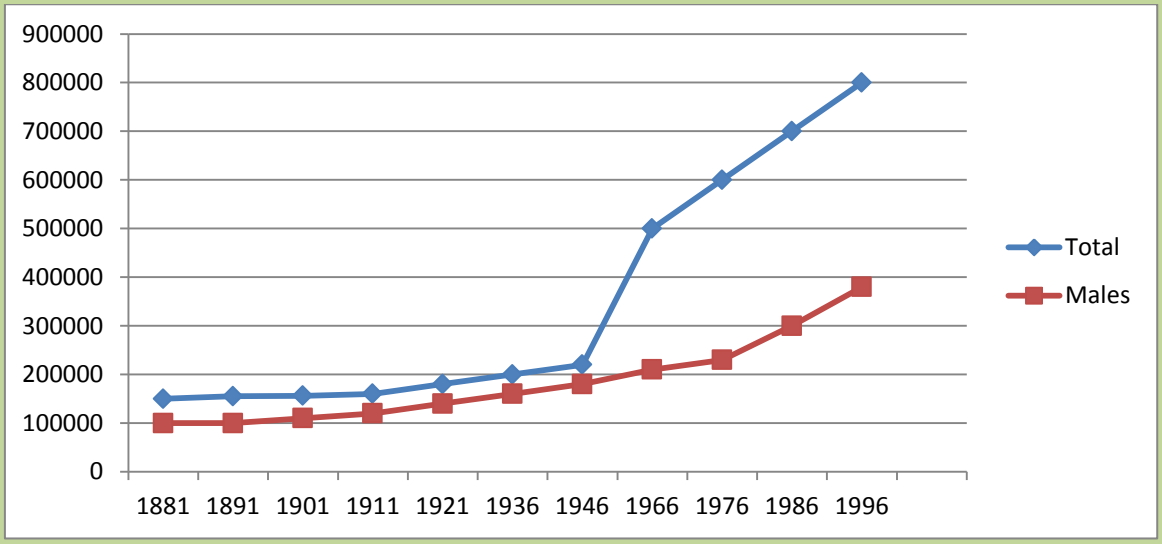
a. What pattern do you notice about the visitor's arrival from Australia during this period?
b. When did the largest number of Australians visitors come to Fiji?
c. How many Australian visitors came to Fiji during this period?
d. Calculate the average number f Australian visitors to Fiji from 2005 to 2008.
e. What could be the reason for the decline in the number of Australian visitors coming to Fiji during this period?

9. This table below shows the height of a bean seedling.

Days	Height of Bean Seedlings(cm)
0	0
1	2.5
2	5
3	10
4	12
5	14.5
6	16
7	17
8	18

a. Draw a line graph to show the growth of the bean seedling.
b. When was the bean seedling 15cm high?
c. When was the bead seedling growing the fastest?
d. How high was the plant after 3 days?
e. How high was the plant after 7 days?

10. The population of males and the total population of Fiji from 1881 to 1996 is shown below by this line graph.



a. What do you notice about the population of males?
b. Estimate the total population of Fiji in (i) 1946, (ii) 1976, (iii) 1996
c. Estimate the population of females in 1976.