SETS CONCEPTS (PRIMARY FIVE)

TERM 1: WEEK 1(Lesson 1 Review of P.4 work on sets)

Definition of a set: A set is a collection of well-defined elements.

Kinds/types of Sets

a) Equal set
b) Equivalent set
c) Joint and disjoint sets
d) Intersection sets
e) Union sets
f) Universal sets
g) Subsets

WEEK 1: Lesson 2.

Equal sets

Equal sets are sets with exactly the same members and the same number of elements. The set symbol for equal sets is " =" **Examples of equal sets**

1. Set A = { 1, 2, 3, 4} and set B = {3, 1, 4, 2}
2. Set C = {u, o, i, a, e} and Set D = {a, e, i, o, u}
3. Set M = {A, ,B, C, D, E} and set N ={D, E, B, A, C}

Equivalent sets: These are sets with same number of members but different number. The symbol is "↔ "

Examples of equivalent sets

1. Set A= {1, 2, 3, 4, 5} and set B={a, e, i, o, u}
2. Set M={A, B, C, D} and set N={ p, u, t, k}
3. Set G={1, 4, 9} and set H={ a, e, i}

Evaluation activity

State the relationship between sets below using equal or equivalent sets.

1. A= {q, e, t, w} and B= {1, 2, 3, 4} _____
2. B= {1, 3, 5, 7} and C= {5, 7, 1, 3} _____
3. D= {A, D, G, 4, H} and K= {a, e, i, o, u} _____
4. E= {MAP, S} and H= {map, s} _____
5. P= { M, A, R, K} and L= {m, a, r, k} _____
6. R= { 1, 2, 3, 5, 6} and P= { 5, 6, 1, 3, 2} _____

Ref: MK Pupils` book 5 page 3

WEEK I: Lesson 3

Joint and Disjoint sets

Joint sets are sets with common member(s).

Examples of Joint sets

1. R= {1, 3, 5, 8, 9} and P= {5, 7, 1, 3, 2} i.e. 1, 3, and 5 are common in both sets.

2. D= {A, D, G, 4, H} and K= {a, A, E, u, D} i.e. A and D are common in both sets.

Disjoint sets are sets with no common member.

Examples of disjoint sets

1. D= {A, D, G, 4, H} and K= {a, e, i, o, u}
2. E= {MAP, S} and H= {map, s}

Evaluation activity

State the relationship between sets below using joint or disjoint sets.

1. G= {q, e, t, w} and D= {1, 2, 3, 4} _____
2. W= {1, 3, 5, 7} and F= {5, 7, 1, 3} _____
3. R= {A, D, G, 4, H} and K= {a, e, i, o, u} _____
4. B= {MAP, S} and C= {map, s} _____
5. D= { 1, 2, 3, 5, 11} and P= { 5, 8, 1, 0, 2} _____
6. A= { k, e, f, s} and B= { c, h. e, f} _____

WEEK 1: Lesson 4

Intersection sets. These are sets which form common members. The set symbol for intersection of sets is "∩"

Listing members of intersection of sets

Examples:

1. Given that set K= { 1, 2, ③, ④} and set R= {③ ④ 5, 6, 8},

$K \cap R = \{3, 4\}$

2. Given that set A= { a, e, I, o, u} and set B= { 1, 4, e, o},

$A \cap B = \{e, o\}$

Union set: This is a set of all members without repeating the common members.

Listing the Union sets.

Examples:

1. Given that set G= {q, e, t, w} and D= {e, w, y, q, o},

   $G \cup D = \{q, e, t, w, y, o\}$

2. Given that set D= {2, 4, 6, 8} and set E= { 1, 2, 3, 4},

   $D \cup E = \{2, 4, 6, 8, 1, 3\}$

Evaluation activity

1. Set G= {q, e, t, w} and set D= {a, e, i. o, u}

   Find; a) $G \cap D$ b) $G \cup D$

2. Set W= {1, 3, 0, 5, 7} and set F= {5, 7, 9, 3}

   Find; a) $W \cap F$ b) $W \cup F$

3. Set R= {A, D, G, 4, H} and set K= {G, W, 2, 4, 5}

   Find; a) $R \cap K$ b) $R \cup K$

4. Set B= {1, 3, 5, 7} and set C= {2, 3, 5, 8, 9}

   Find; a) $B \cap C$ b) $B \cup C$

WEEK 1: Lesson 5

SUBSETS

A subset is a small set got from a big set.

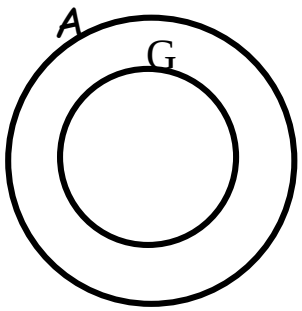
The bigger set from which a subset is got is called a

Universal set or Super set.

The symbol for is a subset of is $\subset$

The symbol for is not a subset of is $\not\subset$. The symbol for Universal set is ξ.

1. Draw a Venn diagram to show that all goats (G) are Animals (A)



3. Given that set Q = {a, b, c}. List down all the subsets in set Q.

{a}, {b}, {c}

{a, b}, {a, c}, {b, c}

{}, {a, b, c} $\Longrightarrow$ 8 Subsets

N.B The empty set and the set itself (universal) are subsets of every set.

Evaluation activity

List the subsets for each of the following sets:

1. B = {p, q}
2. C= {x, y, z}
3. D= { t }
4. E={ p, q, r, s}
5. { }
6. Draw a venn diagram to show that ;
   a) All dogs (D) are animals (A)
   b) All girls (G) are female (F)
   c) All boys (B) are male (M)

WEEK 1: Lesson 6

By calculating,

To find the number of subsets in set i.e. Z = {7, 5, 3},

No. of subsets = 2^n where n represents the number of elements in the given set.

∴ Set Z has 3 elements

∴ No. of subsets = 2^n

$= 2^3$

$= 2 \times 2 \times 2$

$= 4 \times 2$

= 8 subsets

NB: Adequate examples can be given before the activity

Evaluation activity

How many subsets are in each of the sets below?

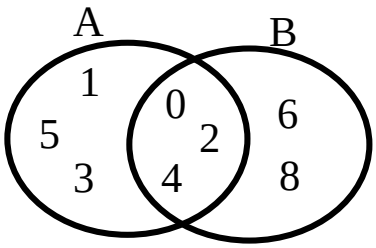
1. Set K= {a, e}
2. Set M= {1, 2, 3}
3. Set H= {w, y, z, u}
4. Set N= {1, 4, 9, 16, 25}
5. Set P= {a, e, I, o, u}

WEEK 2: Lesson 1

Drawing venn diagrams to show the intersection and Union of sets.

Examples

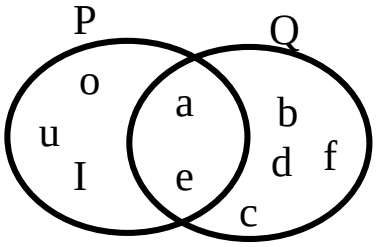
1. Set A= {0, 1, 2, 3, 4, 5} and B= {0, 2, 4, 6, 8}. Draw a Venn diagram to show, i) $A \cap B$ ii) $A \cup B$



i) $A \cap B = \{0, 2, 4\}$

ii) $A \cup B = \{0, 1, 2, 3, 4, 5, 6, 7, 8\}$

2. Set P= {a, e, I, o, u} and Q= {a, b, c, d, e, f}. Draw a venn diagram to show; i) $P \cap Q$ ii) $P \cup Q$



i) $P \cap Q = \{a, e\}$

ii) $P \cup Q = \{o, u, I, a, e, b, d, c, f\}$

Evaluation activity

Draw venn diagrams and show the intersection and the union in each of the following sets

1. Set G= {q, u, k, e, t, w} and set D= {a, e, i. o, u}

   Find; a) $G \cap D$ b) $G \cup D$

2. Set W= {1, 3, 0, 5, 7} and set F= {5, 2, 7, 9, 3}

   Find; a) $W \cap F$ b) $W \cup F$

3. Set R= {A, D, G, 4, H} and set K= {G, W, 2, 4, 5}

   Find; a) $R \cap K$ b) $R \cup K$

4. Set B= {1, 3, 5, 4, 7} and set C= {2, 3, 5, 8, 9}

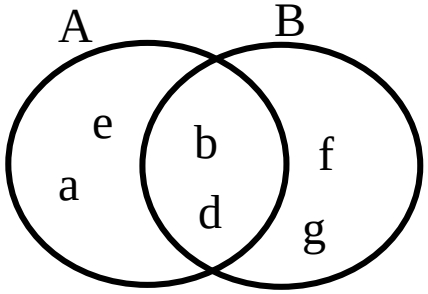
   Find; a) $B \cap C$ b) $B \cup C$

WEEK 2: Lesson 2

Difference of sets

Examples:

1. Study the Venn diagrams below and answer the questions that follow.



a) Find n(A – B)

A-B= {e, a}

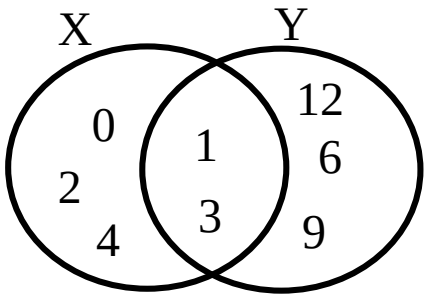
n(A-B)= 2

b) n(B – A)

B-A= {f, g}

n(B-A)= 2

2. Given that X = { 0, 1, 2, 3, 4} and Y = { 1, 3, 6, 9, 12}



a) Find n(X-Y)

X-Y = {0, 2, 4}

n(X-Y)= 3

b) n(Y-X)

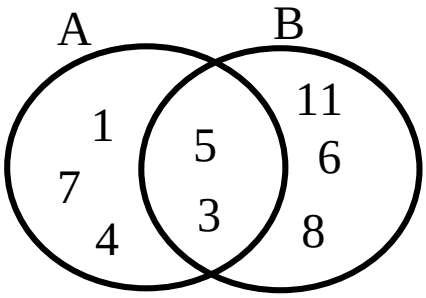
Y-X = {12, 6, 9}

n(Y-X)= 3

Evaluation activity

Study the venn diagrams below and answer the questions that follow.

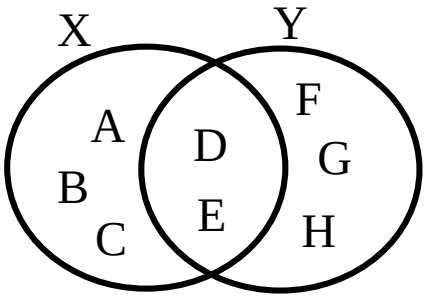
1.



a) Find n(A – B)

b) Find n(B-A)

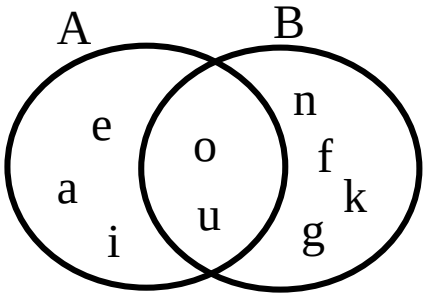
2.



a) Find n(X-Y)

b) Find n(Y-X)

3.



a) Find n(A-B)

b) Find n(B-X)

WEEK 2: Lesson 3

Complement of sets.

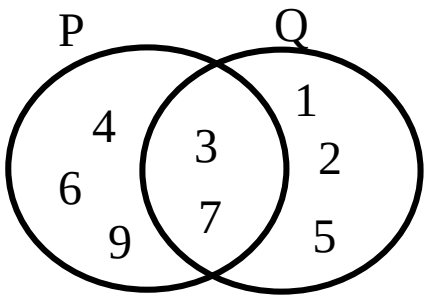
Complement of a set means a set of members not in the given set.

OR

Elements in the universal set but not in the given set.

Example

1. Given that; P = {4, 3, 6, 7, 9} and Q = {1, 2, 3, 5, 7}



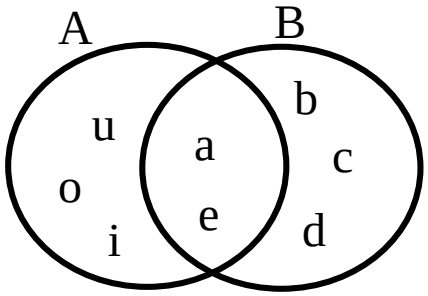
a) Write down members in P′ (Complement of set P)

P′ = {1, 2, 3}

b) Write down members in Q′ (Complement of set Q)

Q′ = {4, 6, 9}

2. Given that; A = {a, e, i, o, u} and B = {a, b, c, d, e}



a) Write down members in A′ (Complement of set A)

A′ = {b, c, d}

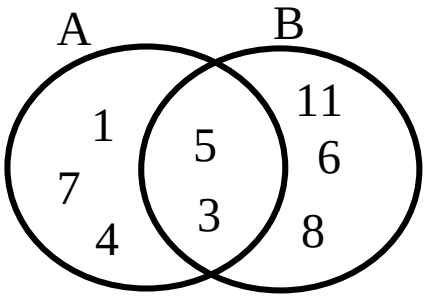
c) Write down members in B' (Complement of set B)

B' = {u, o, i}

Evaluation activity

Use the venn diagrams below to answer the questions that follow

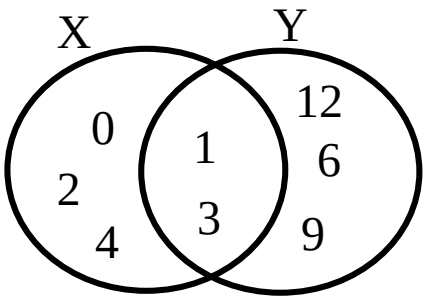
1.



a) Write down members in A' (Complement of set A)

b) Write down members in B' (Complement of set B)

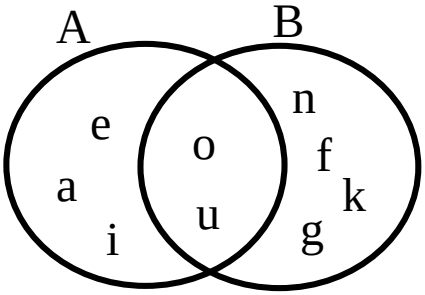
2.



a) Write down members in X' (Complement of set X)

b) Write down members in Y' (Complement of set Y)

3.



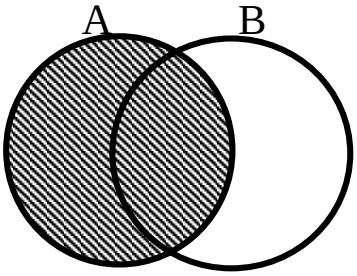
a) Write down members in A′ (Complement of set A)

b) Write down members in B′ (Complement of set B)

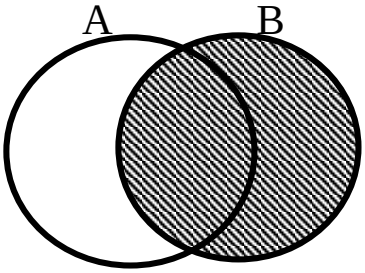
WEEK 2: Lesson 4

Shading regions of venn diagrams

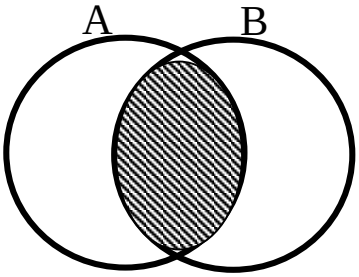
1. Shade set A



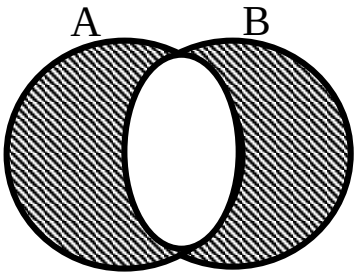
2. Shade set B



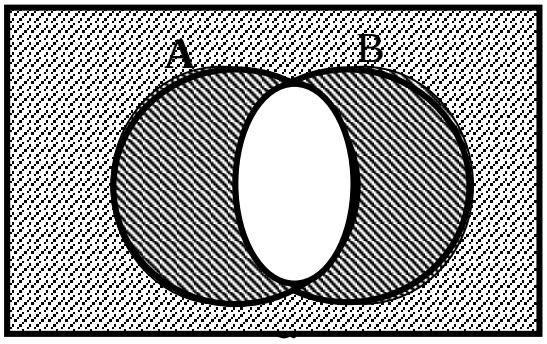
3. Shade $(A \cap B)$



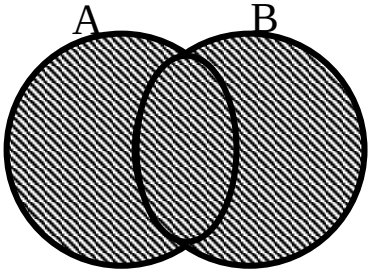
4. Shade $(A \cap B)'$



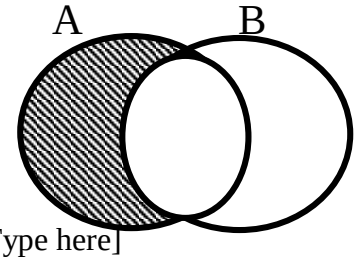
4. Shade $(A \cap B)'$



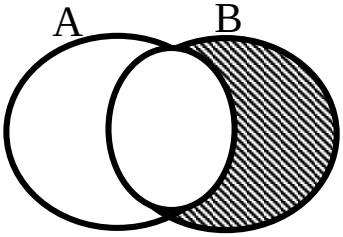
5. Shade $A \cup B$



6. Shade (A-B)



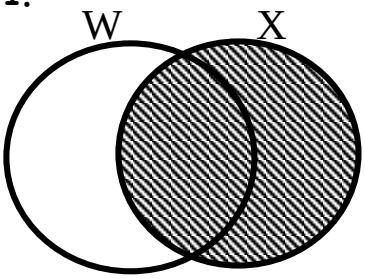
7. Shades (B-A)



Evaluation activity

Describe the shaded parts of each of the venn diagrams below

1.



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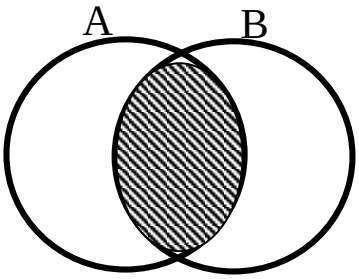

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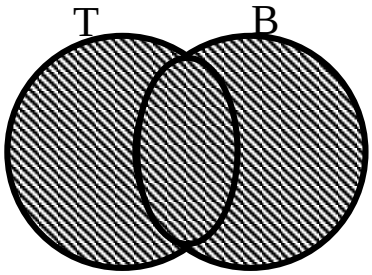

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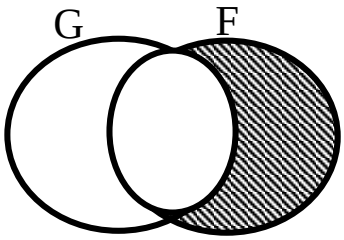

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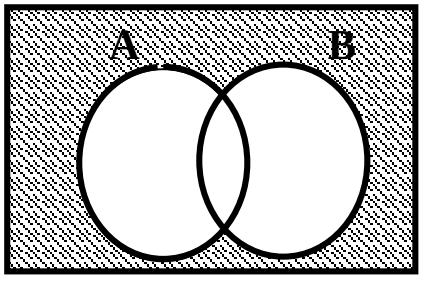

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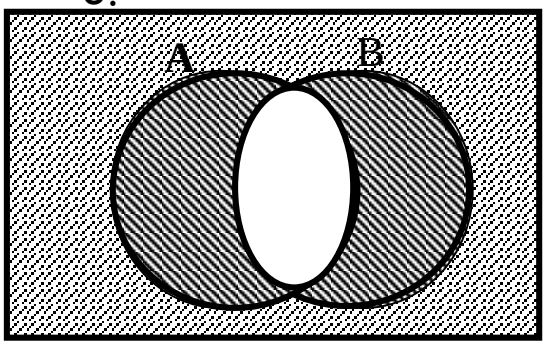


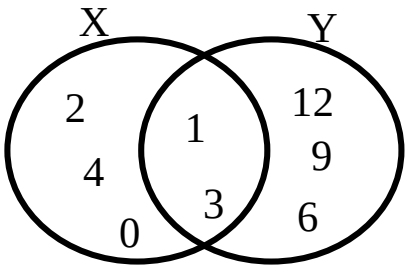
WEEK 2: Lesson 5

Listing and finding number of number of elements from venn diagrams:

Examples

Given that X = { 0, 1, 2, 3, 4} and Y = {1, 3, 6, 9, 12}

a) Represent the two sets on the Venn diagram



b) Find n(X-Y)

X-Y = {2, 4, 0}

n(X-Y) = 3

c) Find n(Y-X)

Y-X = {12, 9, 6}

n(Y-X) = 3

d) Find n(X∩ Y)

X∩ Y = {1, 3}

n(X∩ Y) = 2

e) Find n(X ∪ Y)

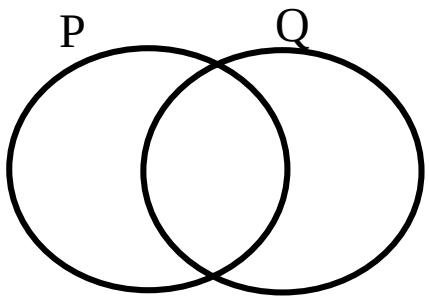
X ∪ Y = {2, 4, 0, 1, 3, 12, 9, 6}

n(X ∪ Y) = 8

Evaluation activity

1. Given that set P={3, 4, 6, 7, 9} and set Q= {1, 2, 3, 5, 7}

   a) Represent the two sets on the Venn diagram



b) Find n(P-Q)

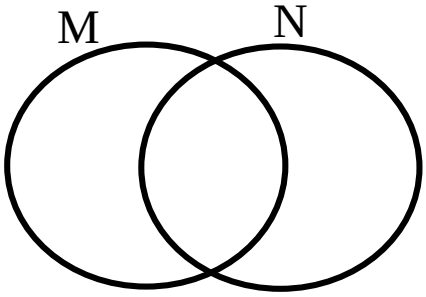
c) Find n(Q-P)

d) Find n(P∩ Q)

e) Find n(P ∪ Q)

2. Given that set M={a, e, I, o, u} and set N ={a, b, c, d, e}.

a) Represent the two sets on the Venn diagram



a) Find n(M)'

b) Find n(N)'

c) Find n(M∩ N)

d) Find n(M ∪ N)

e) Find n(M)

f) Find n(N)

g) Find n(M-N)

h) Find n(N-M)

WEEK 2: Lesson 6

APPLICATION OF SETS

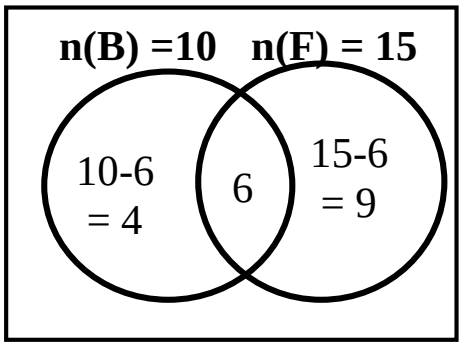
In a group of swimmers, 15 do free style (F) 10 do backstroke (B) and 6 do both

n(F) = 15

n(B) = 10

$n(F \cap B) = 6$

a) Represent the above information on a Venn diagram.



b) How many swimmers swim only back stroke?

10 - 6

4 swimmers

c) How many do only free style?

15 – 6

19 swimmers

d) How many swimmers are in that group?

(10 + 6) + 6 + (15 – 6)

4 + 6 + 9

10 + 9

= 19 swimmers

e) How many swim only one style?

Backstroke only + free style

(10 – 6) + 15 – 6

4 + 9

= 13 swimmers

Evaluation activity

1. Given that n (A) = 15 n (B) = 25 n (A∩B) = 5

a) Represent the above information on a Venn diagram

b) Find n(A ∪ B)

c) Find n(A∩B)'

d) Find n(A-B)

2. In a class, 30 pupils like Mathematics (M) 20 like Science (S) and 5 pupils like both subjects

a) Represent the above information on a Venn diagram

b) How many pupils do not like Science?

c) How many pupils do not like Mathematics?

d) How many pupils are in the class altogether?

e) How many pupils like only one subject?

WEEK 3: Lesson 1

PROBABILITY: This refers to the likelihood for an event to happen. Probability is also known as chance.

Probability = $\frac{No.of\ total\ chances}{No.of\ desired\ chances}$

Tossing a coin

A coin has 2 faces ahead and a tail. When it is tossed, the probability of a head or a tail showing up is a half.

Example: A coin is tossed once, what is the probability that a head will show up?

Total chances = 2 i.e. a head and a tail

Desired chances = 1 i.e. a head

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

Tossing a dice

A dice has 6 faces i.e. {1, 2, 3, 4, 5, 6}.The probability of getting one of the faces showing up is a sixth.

Example: A die is tossed once, what is the chance that an even number will show on top?

Total chances = 6 i.e. {1, 2, 3, 4, 5, 6}

Desired chances = 3 i.e. {2, 4, 6)

Probability = $\frac{3}{6}$

Evaluation activity

1. A coin is tossed once, what is the probability that;
   a) A head will show up?
   b) A tail will show up?
2. A die is tossed once, what is the probability that;
   a) An odd number will show up?
   b) A number less than 3 will show up?
   c) A multiple of 3 will show up?
   d) A prime number will show up?
   e) A number greater than 4 will show up?

WEEK 3: Lesson 2

More about probability

Example.

1) What is the probability of picking a ripe mango, if there are 4 ripe mangoes and 6 rotten mangoes in a basket?

   Total chances = 10 i.e. 4+6 = 10

   Desired chances = 4 i.e. 4 ripe mangoes

   Probability = $\frac{4}{10}$

2) We shall go on a tour next week. What is the probability that we shall go on a day that begins with letter "T"?

Total chances = 7 i.e. {Mon, Tue, Wed, Thurs., Fri, Sat, Sun}

Desired chances = 2 i.e. {Tue, Thurs}

Probability = $\frac{2}{7}$

3) Our school will play a football match with Kampala Parents` School. What is the probability that our school will win the match?

Total chances = 3 i.e. {win, lose, draw}

Desired chances = 1 i.e. {win}

Probability = $\frac{1}{3}$

Evaluation activity

1. What is the probability of picking a ripe mango, if there are 4 ripe mangoes and 5 raw mangoes in a basket?
2. We shall go for a wedding party next week. What is the probability that we shall go on a day that begins with letter "S"?
3. In a bag, there are 3 red pens, 5 black pens, 7 green pens and 4 blue pens. Find the chance of picking;

   a) A back pen. b) a red pen. c) a blue and red pen.

END OF SET CONCEPTS