APPLICATIONS OF TRIGONOMETRY

Content

1) Introduction

i. Trigonometry
ii. Trigonometry identities
iii. Values of T ratio
iv. Angle of elevation and depression

2) Problems

i. Two of the sides given
ii. One angle and one side given
iii. Two heights and one angle
iv. Two angles and one height
v. Two angles and two heights
vi. Calculating time and distance

3)Practice problems

1.i) Trigonometry:

Trigonometry:

In a right angled Δ OAB, where $\angle BOA = \theta$,

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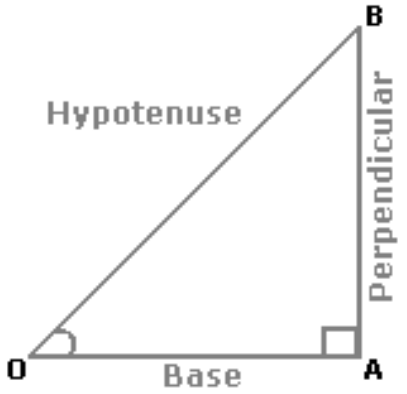


i. $\sin\theta = \dfrac{\text{Perpendicular}}{\text{Hypotenuse}} = \dfrac{AB}{OB};$

ii. $\cos\theta = \dfrac{\text{Base}}{\text{Hypotenuse}} = \dfrac{OA}{OB};$

iii. $\tan\theta = \dfrac{\text{Perpendicular}}{\text{Base}} = \dfrac{AB}{OA};$

iv. $\text{cosec}\,\theta = \dfrac{1}{\sin\theta} = \dfrac{OB}{AB};$

v. $\sec\theta = \dfrac{1}{\cos\theta} = \dfrac{OB}{OA};$

vi. $\cot\theta = \dfrac{1}{\tan\theta} = \dfrac{OA}{AB};$

1.ii) Trigonometry Identities:

$\sin^2 \theta + \cos^2 \theta = 1.$

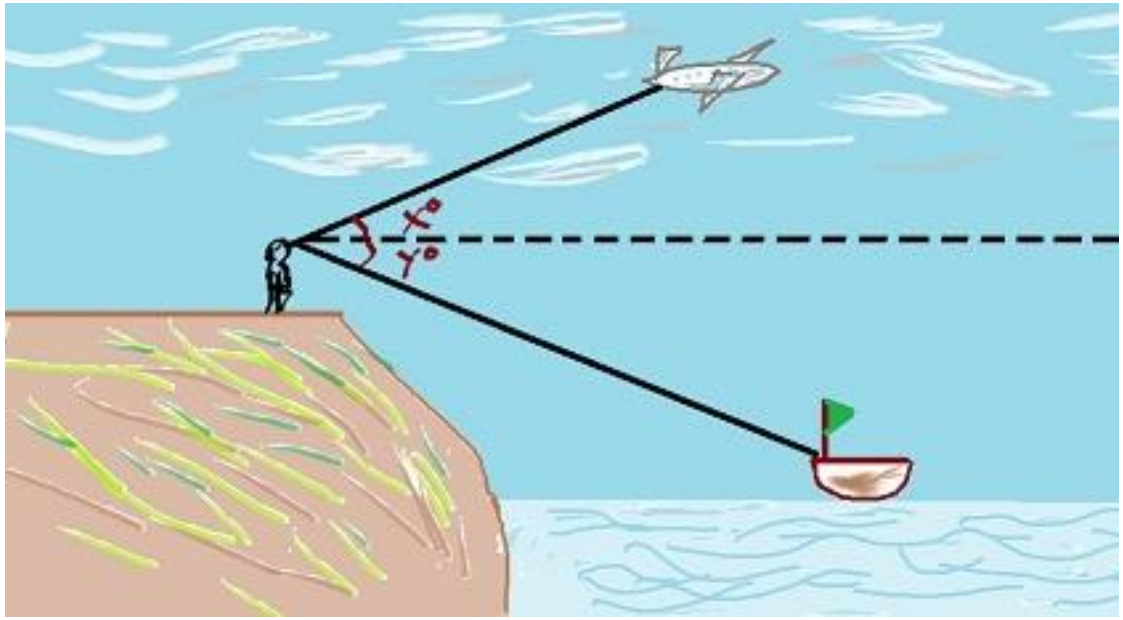
$1 + \tan^2 \theta = \sec^2 \theta.$

$1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$

1.iii) Values of T-ratios:

	0°	30°	45°	60°	90°
sin θ	0	1/2	$1/\sqrt{2}$	$\sqrt{3}/2$	1
cos θ	1	$\sqrt{3}/2$	$1/\sqrt{2}$	1/2	0
tan θ	0	$1/\sqrt{3}$	1	$\sqrt{3}$	Not defined

1.iv) Angle of elevation and depression



x – angle of elevation
y – angle of depression

Note: *The base line for angle of elevation and angle of depression will always be the horizontal line.*

2) Problems

2.i) Two of the sides given

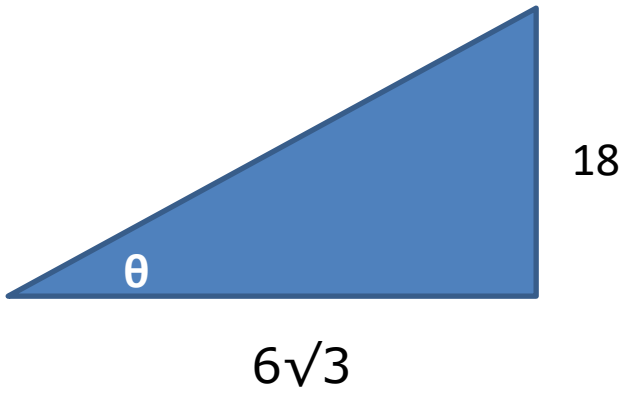
Example: Find the angle of elevation of the sun when the shadow of a pole of 18 m height is $6\sqrt{3}$ m long?

Given:

Perpendicular = 18 m

Base = $6\sqrt{3}$ m

Angle = ?



Solution:

tan θ = perpendicular/base

$= 18/ 6\sqrt{3}$

$= 3/\sqrt{3}$

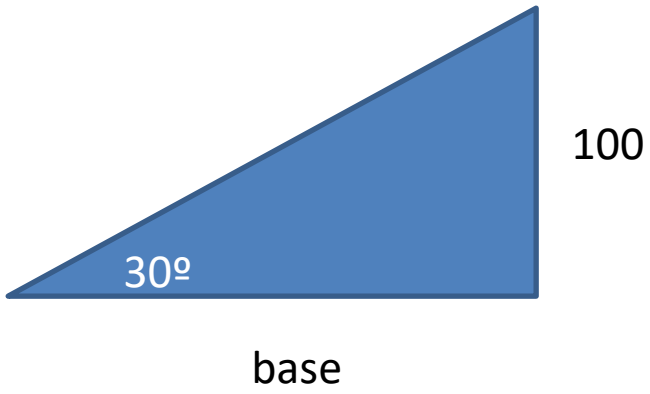
$= \sqrt{3}$

θ = 60º

2.ii) One angle and one of the sides given

Example: From a point P on a level ground, the angle of elevation of the top tower is 30º. If the tower is 100 m high, then what is the distance of point P from the foot of the tower.

Given:
Perpendicular = 100 m
Angle = 30º
Base = ?



Solution:

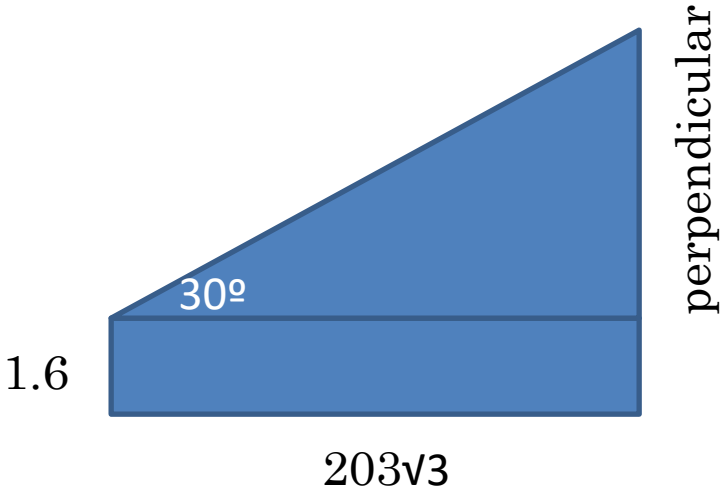
tan θ = perpendicular/base
tan 30º = 100/base
1/ √3 = 100/base
Base = 100 √3
= 173 m

2.iii) Two heights and one angle

Example: An observer 1.6 m tall is $203\sqrt{3}$ m away from a tower. The angle of elevation from his eye to the top of the tower is 30º. Find the height of the tower.

Given:
Base = $203\sqrt{3}$ m
Angle = 30º

Height = perpendicular + 1.6 = ?



Solution:

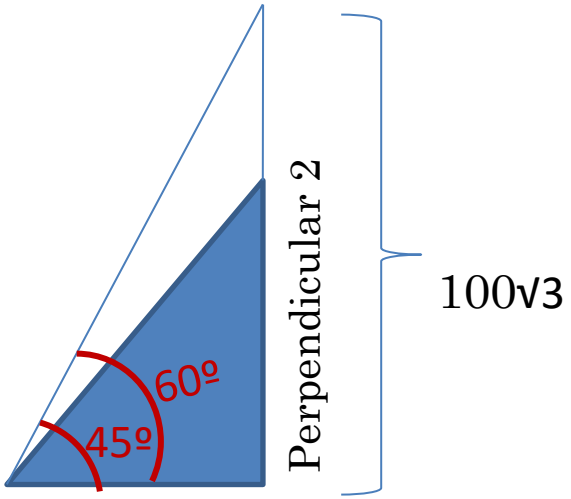
tan θ = perpendicular / base
tan 30º = perpendicular / $203\sqrt{3}$
$1/\sqrt{3}$ = perpendicular / $203\sqrt{3}$
Perpendicular = $203\sqrt{3} / \sqrt{3}$
Perpendicular = 203 m
Height of the tower = perpendicular + 1.6
= 203 + 1.6
= 204.6m

2.iv) Two angles and one height

Example: An aeroplane when 100√3 m high passes vertically above another aeroplane at an instant when their angles of elevation at same observing point are 60° and 45° respectively. Approximately, how many meters higher is the one than the other?

Given:

Perpendicular 1 = 100√3 m
Angle 1 = 60°
Angle 2 = 45°



Difference b/w the heights =Perpendicular 1 - Perpendicular 2 = ?

Solution:

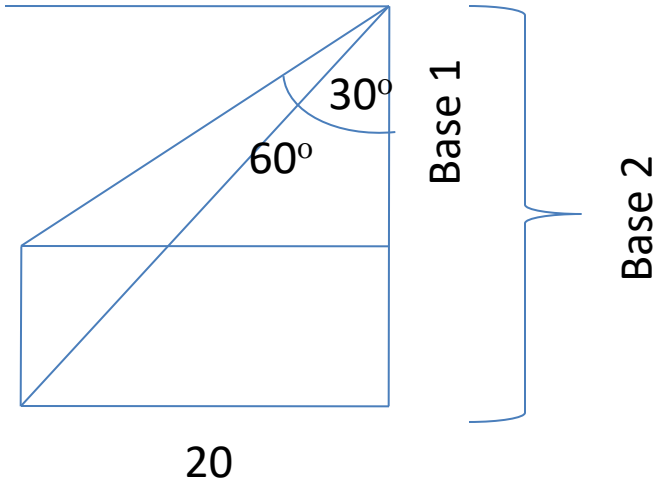
Angle 1 = Perpendicular 1/ Base
tan 60° = 100√3 / base
√3 = 100√3 /base
Base = 100√3 / √3
Base = 100

Angle 2 = Perpendicular 2/ Base
tan 45° = Perpendicular 2 / 100
1 = Perpendicular 2 / 100
Perpendicular 2 = 100

Difference b/w the heights =Perpendicular 1 - Perpendicular 2
= 100√3 – 100
= 173 – 100
= 73 m

2.v) Two angles and two heights

Example: Two towers face each other separated by a distance *d* = 20 m. As seen from the top of the first tower, the angle of depression of the second tower's base is 60^o and that of the top is 30^o. What is the height of the second tower?



Given:

Angle 1 = $90^o - 30^o = 60^o$

Angle 2 = $90^o - 60^o = 30^o$

Perpendicular = 20m

Height of the second tower = Base 2 – Base 1

Solution:

Angle 2 = perpendicular/base 2

$\tan 30^o$ = 20 / base 2

$1/\sqrt{3}$ = 20 / base 2

Base 2 = $20\sqrt{3}$

Angle 1 = perpendicular / base 1

$\tan 60^o$ = 20 / base 1

$\sqrt{3}$ = 20 / base 1

Base 1 = 20 / $\sqrt{3}$

Height of the second tower = Base 2 – Base 1

$= 20\sqrt{3} – 20 / \sqrt{3}$

$= 20\sqrt{3} - 20\sqrt{3} / 3$

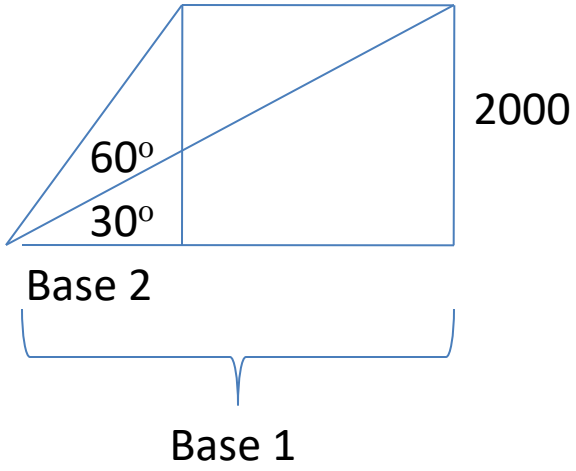
$= 20\sqrt{3} (1 – 1/3)$

$= 20\sqrt{3} (2/3)$

$= 40\sqrt{3} / 3$

2.vi) Calculating time and speed

Example: You are stationed at a radar base and you observe an unidentified plane at an altitude *h* = 2000 m flying towards your radar base at an angle of elevation = 30^o. After exactly one minute, your radar sweep reveals that the plane is now at an angle of elevation = 60^o maintaining the same altitude. What is the speed (in m/s) of the plane?



Given:

Angle 1 = 30^o
Angle 2 = 60^o
Perpendicular = 2000 m
Time = 60 sec
Speed = distance / time
= (base 1 – base 2) / time

Solution:

Angle 1 = perpendicular / base 1
tan 30^o = 2000 / base 1
$1/\sqrt{3}$ = 2000 / base 1
Base 1 = $2000\sqrt{3}$

Angle 2 = perpendicular / base 2
Angle 60^o = 2000 / base 2
$\sqrt{3}$ = 2000 / base 2
Base 2 = 2000 / $\sqrt{3}$

Speed = distance / time
= (base 1 – base 2) / time
= ($2000\sqrt{3}$ - 2000 / $\sqrt{3}$) / 60
= $200\sqrt{3}$ / 9 m/s

3) PRACTICE PROBLEMS

1. Find the angle of elevation of the sun when the shadow of a pole of 18 m height is $6\sqrt{3}$ m long?

A. 30°
B. 60°
C. 45°
D. None of these

2. The angle of elevation of the sun, when the length of the shadow of a tree is √3 times the height of tree, is :

A. 30 degree
B. 45 degree
C. 60 degree
D. 9 degree

3. From a tower of 80 m high, the angle of depression of a bus is 30°. How far is the bus from the tower?

A. 80 m
B. 80√3 m
C. 80/√3m
D. 240 m

4. From a point P on a level ground, the angle of elevation of the top of a tower is 30^0 If the tower is 100 m high, the distance of point P from the foot of the tower is:

A. 149 m
B. 156 m
C. 173 m
D. 200 m

5. The thread of a kite is 120 m long and it is making 30° angular elevation with the ground .What is the height of the kite?

A. 60 m
B. 20 m
C. 40 m
D. 10 m

6. The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is:

A. 2.3 m
B. 4.6 m
C. 7.8 m
D. 9.2 m

7. When the sun's altitude changes from 30° to 60°, the length of the shadow of a tower decreases by 70m. What is the height of the tower?

A. 55.6 m
B. 60.6 m
C. 65.6 m
D. 70.6 m

8. The length of the shadow of a vertical tower on level ground increases by 10 metres when the altitude of the sun changes from 45° to 30°. Then the height of the tower is:

A. $5\sqrt{3}$ m

B. $10(\sqrt{3} + 1)$ m

C. $5(\sqrt{3} + 1)$ m

D. $10\sqrt{3}$ m

9. A vertical post 15 ft. high is broken at a certain height and its upper part, not completely separated meets the ground angle of 30^0. Find the height at which the post is broken.

A. 10 ft.

B. 5 ft.

C. $15\sqrt{3}\ (2-\sqrt{3})$ ft.

D. $5\sqrt{3}$ ft.

10. The top of a 15 m high tower makes an angle of elevation of 60 degree with the bottom of an electric pole and an angle of 30 degree with the top of the pole. What is the height of the pole?

A. 12 m
B. 10 m
C. 11 m
D. 5 m

11. Two pillars of equal height are on either side of a road, which is 120m wide. The angles of elevation of the top of the pillars are 60^0 and 30^0 at a point on the road between the pillars. Find the height of the pillars.

A. $10\sqrt{3}$ m
B. $30\sqrt{3}$ m
C. $20\sqrt{3}$ m
D. None of these

12. Two ships are sailing in the sea on the two sides of a lighthouse. The angle of elevation of the top of the lighthouse is observed from the ships are 30° and 45° respectively. If the lighthouse is 100 m high, the distance between the two ships is:

A. 173 m
B. 200 m
C. 273 m
D. 300 m

Q1.A	**Q2. A**	**Q3. B**	**Q4. C**
Q5. A	**Q6. D**	**Q7. B**	**Q8. C**
Q9. B	**Q10. B**	**Q11. B**	**Q12. C**

SEATING ARRANGEMENT

SEATING ARRANGEMENT

Linear arrangement
Circular Arrangement
Square table arrangement

Linear Arrangement: Here the arrangement of the persons is linear i.e. you have to arrange them in a line. Here generally a single row of arrangement is formed.

Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary.

1. Who is sitting immediate right to Reeta ?

A. Bindu
B. Rani
C. Mary
D. Seema

Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary.

2. Who is in the middle of the photograph ?

A. Bindu
B. Rani
C. Reeta
D. Seema

Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary.

3. Who is second from the right ?

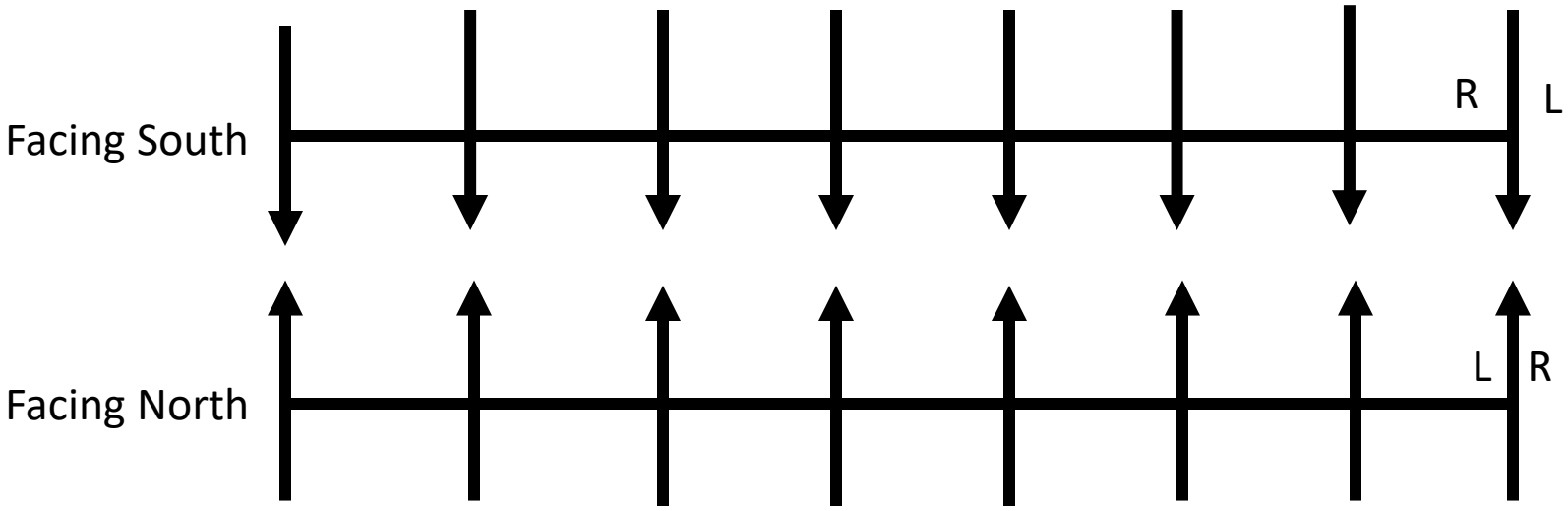
A. Mary
B. Rani
C. Reeta
D. Bindu

Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary.

4. Who is second from the left in photograph ?

A. Reeta
B. Mary
C. Bindu
D. Seema

Double row arrangement: In these questions, there will be two groups of persons. You have to arrange one group in one row and the other group in other row. The persons in these rows normally face each other.



Direction: A ,B, C, D and E are five men sitting in a line facing to south - while M, N, O, P and Q are five ladies sitting in a second line parallel to the first line and are facing to North.
B who is just next to the left of D, is opposite to Q.
C and N are diagonally opposite to each other.
E is opposite to O who is just next right of M.
P who is just to the left of Q, is opposite to D.
M is at one end of the line.

5. Who is sitting third to the right of O ?

A. Q
B. N
C. M
D. Data inadequate

Direction: A ,B, C, D and E are five men sitting in a line facing to south - while M, N, O, P and Q are five ladies sitting in a second line parallel to the first line and are facing to North.
B who is just next to the left of D, is opposite to Q.
C and N are diagonally opposite to each other.
E is opposite to O who is just next right of M.
P who is just to the left of Q, is opposite to D.
M is at one end of the line.

6. If B shifts to the place of E, E shifts to the place of Q, and Q shifts to the place of B, then who will be the second to the left of the person opposite to O ?
A. Q
B. P
C. E
D. D

Direction: A ,B, C, D and E are five men sitting in a line facing to south - while M, N, O, P and Q are five ladies sitting in a second line parallel to the first line and are facing to North.
B who is just next to the left of D, is opposite to Q.
C and N are diagonally opposite to each other.
E is opposite to O who is just next right of M.
P who is just to the left of Q, is opposite to D.
M is at one end of the line.

7. Which of the following pair is diagonally opposite to each other ?
A. EQ
B. BO
C. AN
D. AM

Direction: A ,B, C, D and E are five men sitting in a line facing to south - while M, N, O, P and Q are five ladies sitting in a second line parallel to the first line and are facing to North.
B who is just next to the left of D, is opposite to Q.
C and N are diagonally opposite to each other.
E is opposite to O who is just next right of M.
P who is just to the left of Q, is opposite to D.
M is at one end of the line.

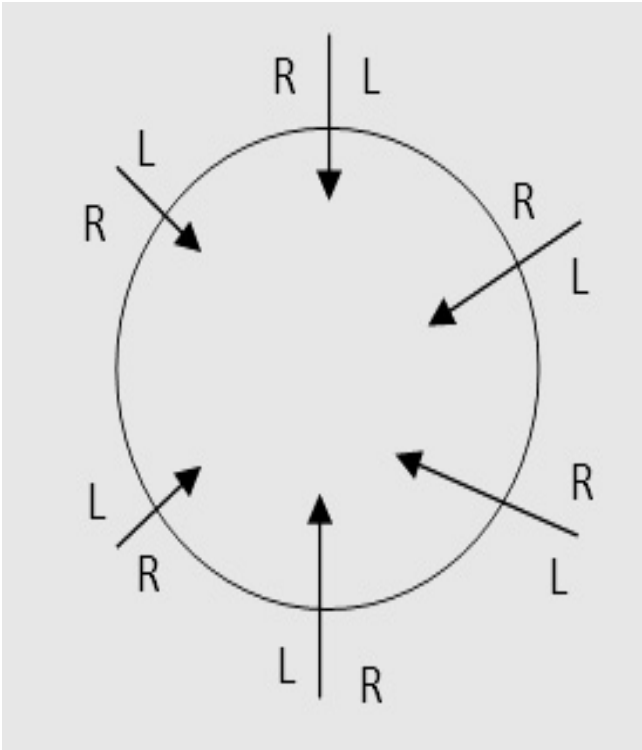
8. If O and P, A and E and B and Q interchange their positions, then who will be the second person to the right of the person who is opposite to the person second of the right of P ?

A. D
B. A
C. E
D. O

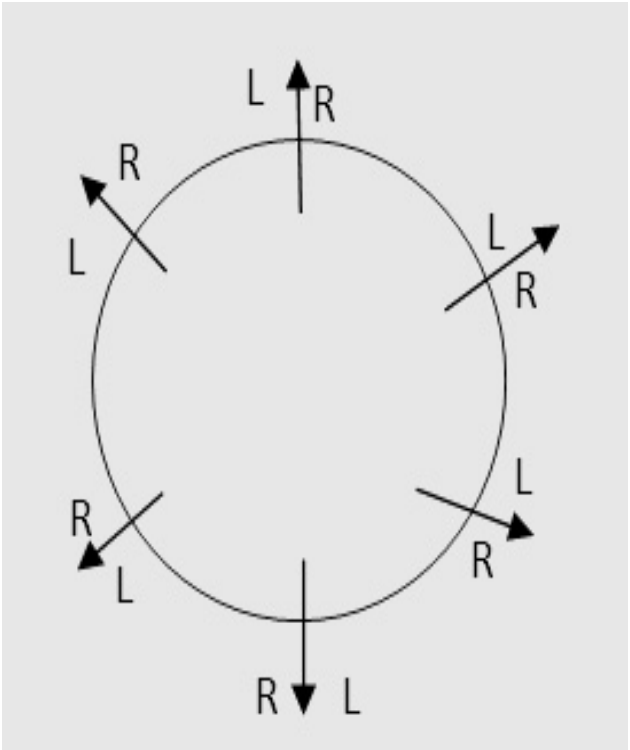
Direction: A ,B, C, D and E are five men sitting in a line facing to south - while M, N, O, P and Q are five ladies sitting in a second line parallel to the first line and are facing to North.
B who is just next to the left of D, is opposite to Q.
C and N are diagonally opposite to each other.
E is opposite to O who is just next right of M.
P who is just to the left of Q, is opposite to D.
M is at one end of the line.

9. In the original arrangement who is sitting just opposite to N ?
A. B
B. A
C. C
D. D

Circular arrangement: In the circular seating arrangement questions, you have to arrange the persons around a circular table etc. fulfilling certain conditions.



Facing Center



Facing Outward

Direction: P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre:
P is second to the right of T who is the neighbor of R and V.
S is not the neighbor of P.
V is the neighbor of U.
Q is not between S and W. W is not between U and S.

10. Which two of the following are not neighbors ?

A. RV
B. UV
C. RP
D. QW

Direction: P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre:
P is second to the right of T who is the neighbour of R and V.
S is not the neighbour of P.
V is the neighbour of U.
Q is not between S and W. W is not between U and S.

11. Which one is immediate right to the V ?

A. P
B. U
C. R
D. T

Direction: P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre:
P is second to the right of T who is the neighbour of R and V.
S is not the neighbour of P.
V is the neighbour of U.
Q is not between S and W. W is not between U and S.

12. Which of the following is correct ?

A. P is to the immediate right of Q
B. R is between U and V
C. Q is to the immediate left of W
D. U is between W and S

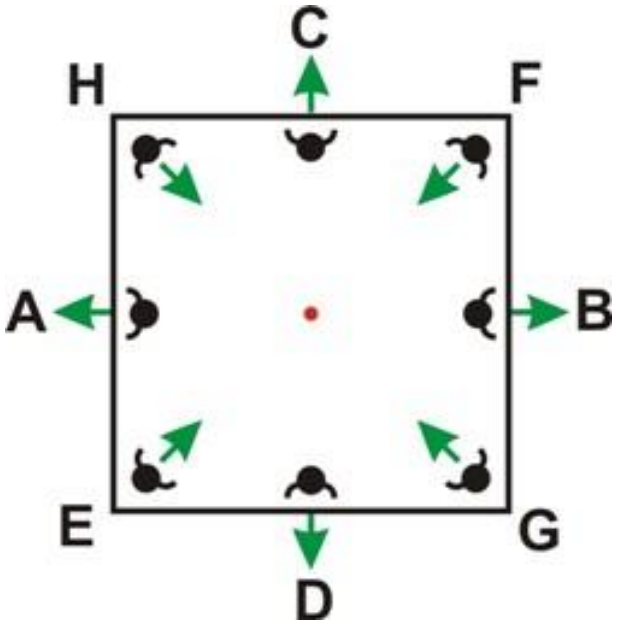
Direction: P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre :
P is second to the right of T who is the neighbour of R and V.
S is not the neighbour of P.
V is the neighbour of U.
Q is not between S and W. W is not between U and S.

13. What is the position of S ?

A. Between U and V
B. Second to the right of P
C. To the immediate right of W
D. Data inadequate.

Rectangular/Square arrangement: These arrangements are almost similar to the circular arrangements; the only difference is that the persons are sitting around a rectangular table.

Facing inward and outward



Direction: 8 persons E, F, G, H, I, J, K and L are seated around a square table - two on each side.
There are 3 ladies who are not seated next to each other.
J is between L and F.
G is between I and F.
H, a lady member is second to the left of J.
F, a male member is seated opposite to E, a lady member.
There is a lady member between F and I.

14. Who among the following is to the immediate left of F ?

A. G
B. I
C. J
D. H

Direction: 8 persons E, F, G, H, I, J, K and L are seated around a square table - two on each side.
There are 3 ladies who are not seated next to each other.
J is between L and F.
G is between I and F.
H, a lady member is second to the left of J.
F, a male member is seated opposite to E, a lady member.
There is a lady member between F and I.

15. What is true about J and K ?

A. J is male, K is female
B. J is female, K is male
C. Both are female
D. Both are male

Direction: 8 persons E, F, G, H, I, J, K and L are seated around a square table - two on each side.
There are 3 ladies who are not seated next to each other.
J is between L and F.
G is between I and F.
H, a lady member is second to the left of J.
F, a male member is seated opposite to E, a lady member.
There is a lady member between F and I.

16. How many persons are seated between K and F ?

A. 1
B. 2
C. 3
D. 4

Directions: 8 persons E, F, G, H, I, J, K and L are seated around a square table - two on each side.
There are 3 ladies who are not seated next to each other.
J is between L and F.
G is between I and F.
H, a lady member is second to the left of J.
F, a male member is seated opposite to E, a lady member.
There is a lady member between F and I.

17. Who among the following are three lady members ?

A. E, H and J
B. E, F and G
C. E, H and G
D. C, H and J

Direction: 8 persons E, F, G, H, I, J, K and L are seated around a square table - two on each side.
There are 3 ladies who are not seated next to each other.
J is between L and F.
G is between I and F.
H, a lady member is second to the left of J.
F, a male member is seated opposite to E, a lady member.
There is a lady member between F and I.

18. Who among the following is seated between E and H ?

A. F
B. I
C. K
D. Cannot be determined

Read the following information carefully and answer the questions given below:

•Zika, Yisha, Xomi, Wara, Veta, Uma, Tani and Sipa are sitting around a circle facing the centre but not necessarily in the same order.

•Yisha sits second to the left of Sipa's husband. No female is an immediate neighbours of Yisha.

•Wara's daughter sits second to the right of Uma. Uma is the sister of Tani. Uma is not an immediate neighbours of Sipa's husband.

•Only one person sits between Zika and Uma. Zika is father of Tani.

•Sipa's brother Wara sits on the immediate left of Sipa's mother.

•Only one person sits between Sipa's mother and Veta.

•Only one person sits between Sipa and Tani. Tani is the mother of Xomi. Tani is not an immediate neighbours of Veta.

19. What is the position of Zika with respect to his mother-in-law?

A.Immediate Left

B.Third to right

C.Third to the left

D.Second to the right

Read the following information carefully and answer the questions given below:
•Zika, Yisha, Xomi, Wara, Veta, Uma, Tani and Sipa are sitting around a circle facing the centre but not necessarily in the same order.
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•Wara's daughter sits second to the right of Uma. Uma is the sister of Tani. Uma is not an immediate neighbours of Sipa's husband.
•Only one person sits between Zika and Uma. Zika is father of Tani.
•Sipa's brother Wara sits on the immediate left of Sipa's mother.
•Only one person sits between Sipa's mother and Veta.
•Only one person sits between Sipa and Tani. Tani is the mother of Xomi. Tani is not an immediate neighbours of Veta.

20. Who amongst the following is Wara's daughter?

(A)Yisha
(B)Xomi
(C)Veta
(D)Tani

Read the following information carefully and answer the questions given below:

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•Only one person sits between Zika and Uma. Zika is father of Tani.

•Sipa's brother Wara sits on the immediate left of Sipa's mother.

•Only one person sits between Sipa's mother and Veta.

•Only one person sits between Sipa and Tani. Tani is the mother of Xomi. Tani is not an immediate neighbours of Veta.

21. What is the position of Zika with respect to his grandchild?

(A)Immediate Right

(B)Third to the right

(C)Third to the left

(D)Second to the left.

Directions(22-26): Study the following information to answer the given questions.

Eight persons – A, B, C, D, E, F, G and H – from eight different fields viz. Agriculture, Banking, Business, Army, Medicine, Navy, Software and Teaching sit in two different rows, four persons in each facing each other but not necessarily in the same order. The following information is given.

(a) B and the person from Teaching are adjacent to each other and one among them sits at one of the ends.

(b) The person from Banking and G are opposite each other. H is not from Banking.

(c) Either C or the person from Navy sits at one of the ends and both sit in the different rows.

(d) Only one person sits to the left of G.

(e) H who is not from Medicine is the neighbours of the persons from Army and Software.

(f) The person from Business who is not D is adjacent to A and opposite E, who faces north.

(g) C sits to the right of the person from Army.

22. Who is from banking field?

A. B

B. A

C. C

D. H

E. None of these

23. Find the odd one out.

A. F-E
B. A-G
C. B-H
D. C-B
E. None of these

24. H is from which field?

A. Business
B. Banking
C. Agriculture
D. Teaching
E. Navy

25. Who among the following are at the ends of the row?

A. H, the person from Business

B. B, E

C. G, D

D. The person from Teaching, E

E. F, A

26. Who sits opposite the person from Army?

A. B

B. G

C. The person from Banking

D. F

E. The person from Business

Directions (Q.27-30): Study the following information carefully and answer the given questions:

M, N, O, P, Q, R, S and T are eight persons. Each of them has a different favourite fruit i.e. Mango, Banana, Apple, Guava, Grapes, Orange, Pineapple and Litchi but not necessarily in the same order. All of them are sitting around a circular table and facing the center.

Neither M nor O is an immediate neighbor of Q. Neither M nor O has Grapes as his favourite fruit. Q sits third to the left of the person whose favourite fruit is Grapes. Only two persons sit between M and O. The person whose favourite fruit is Litchi sits second to the right of T. T is not an immediate neighbor of Q. T doesn't have Grapes as his favourite fruit and Litchi is not the favourite fruit of Q. The person whose favourite fruit is Mango sits third to the left of P. The persons with favourite fruits as Mango and Grapes are not immediate neighbours. Only one person sits between T and the person whose favourite fruit is Apple. Persons with favourite fruits as Banana and Guava are immediate neighbours. Banana is not the favourite fruit of T. Only one person sits between R and the person whose favourite fruit is Orange. The person with Orange as his favourite fruit is an immediate neighbor of N. O and R are not immediate neighbours.

Q.27. Who among the following has Pineapple as his favourite fruit?

a) S b) R c) N d) Q e) P

Q.28. Which of the following would come in place of question mark based upon the given seating arrangement?

TS, RT, NR, PN, ?

a) QP b) SP c) RT d) SM e) None of these

Q.29. Which of the following is true with respect to the given seating arrangement?

a) T and R are sitting opposite to each other.
b) Orange is the favourite fruit of N.
c) Q sits third right of P.
d) Persons with favourite fruits as Orange and Grapes are sitting opposite to each other.
e) None of these.

Q.30. What is the position of person whose favourite fruit is Litchi with respect to S?

a) Immediate right
b) Immediate left
c) Second to the left
d) Second to the right
e) Third to the left

Q1.C	Q2.B	Q3. C	Q4. D
Q5.B	Q6. A	Q7. D	Q8. B
Q9.B	Q10.A	Q11.D	Q12.C
Q13.C	Q14.C	Q15.D	Q16. C
Q17.C	Q18.C	Q19. D	Q20. C
Q21.A	Q22.B	Q23.D	Q24.C
Q25.D	Q26.C	Q27.B	Q28.A
Q29.D	Q30.B		

INEQUALITIES

Inequalities:

There are two types of questions in Inequality –

1) Direct Inequality

2) Coded Inequality

Both kinds of questions can be solved easily once you have gone through the below tables.

In order to understand questions on inequality first you need to have an overview of various terminologies which are used in such questions –

S.NO	SYMBOL	MEANING
1.	$>$	First element is Greater than the Second element.
2.	$<$	First element is Smaller than the Second element.
3.	$=$	First element is Equal to the Second element.
4.	$\geq$	First element is Greater than or Equal to the Second element.
5.	$\leq$	First element is Smaller than or Equal to the Second element.
6.	$\neq$	First element is either greater than or smaller than the Second element.

A to B	B to C	A to C
>	>	>
>	≥	>
≥	>	>
≥	≥	≥
<	<	<
<	≤	<
≤	<	<
≤	≤	≤
>	<	No result
≥	≤	Either or If maximum result are covered i.e (>, <, =)

Practice examples:

1. Statement: $P > Q > R < S \geq T$

Conclusions:

A) $P > R$ B) $P > S$ C) $R = T$ D) $R > T$

2. Statement: $P < Q \leq R < S > T > U \neq Z$

Conclusions:

A) $P < S$ B) $Q \leq S$ C) $R > T$ D) $P \leq R$

3. Statement: $M \leq N \leq O < P$; $K = L \geq O > C$

Conclusions:

A) $M \leq P$ B) $K \geq N$ C) $P \geq K$ D) $M = C$

Directions (4-6): Choose the correct option from the following options:

A. if only conclusion I follow.

B. if only conclusion II follow.

C. if either conclusion I or conclusion II follows.

D. if neither conclusion I nor conclusion II follows.

E. if both conclusions I and II follow.

4. Statements: $P < Q \leq S = T$, $R = Q < U$, $V > U$

Conclusions: I. $P > U$ II. $V > T$

5. Statements: $U \geq X = Y$, $Y \leq Z \leq S$, $T = W > Z$

Conclusions: I. $T \leq U$ II. $S > U$

6. Statements: $A \geq P = S > T$, $V < B = T \geq X$

Conclusions: I. $A > X$ II. $P < B$

Directions(7-11):

‘P©Q’ means ‘P’ is greater than ‘Q’.

‘P%Q’ means ‘P’ is smaller than ‘Q’.

‘P@Q’ means ‘P’ is either greater than or equal ‘Q’.

‘P$Q’ means ‘P’ is either smaller than or equal to ‘Q’.

‘P#Q’ means ‘P’ is equal to ‘Q’.

A) If only conclusion I is true.

B) If only conclusion II is true.

C) If either conclusion I or II is true.

D) If neither conclusion I nor II is true.

E) If both conclusions I and II are true

7. Statements: M @ R, R ©F, F#L

Conclusions:

I. R@L II. M@L

8. Statements: T % J, J @ V, V # W

Conclusions:

I. T©W II. W@T

9. Statements: J @ D, D$ L, L#N

Conclusions:

I. J # L II. J $ L

10. Statements: R $ M, M%H,H$F

Conclusions:

I. R % F II. M $ F

11. Statements: K $ H, H % I, I © F

Conclusions:

I. K $ I II. H % F

Practice questions:

12. In the question symbols *, @, %, $ and # are used with the following meaning.

- 'P $ Q' means 'P is not greater than Q'
- 'P * Q' means 'P is neither smaller than nor greater than Q'
- 'P # Q' means 'P is neither greater than nor equal to Q'
- 'P % Q' means 'P is not smaller than Q'
- 'P @ Q' means 'P is neither smaller than nor equal to Q'

Assuming the statements to be true, find out which of the two conclusions I and II is/are definitely true.

Statements:

D % H, K * H, H $ R

Conclusions

I. K $ R

II. D % K

(a) Only conclusion I is true

(b) Only conclusion II is true

(c) Either conclusion I or II is true

(d) Neither conclusion I nor II is true

(e) Both follows

13. Given signs signify something and on that basis, assume the given statements to be true and find which of the two conclusions I and II is/are definitely true.

A+B means A is equal to B

A-B means A is less than B

A=B means A is not equal to B

A*B means A is greater than equal to B

A/B means A is less than equal to B

Statements

K+L, K/M, M-N

Conclusions

I) M+L

II) K-N

(a) Only conclusion I is true

(b) Only conclusion II is true

(c) Neither conclusion I nor II is true

(d) Both conclusions I and II are true

14. Study the following information to answer the given questions

- P$Q means P is not smaller than Q
- P@Q means P is neither smaller than nor equal to Q
- P#Q means P is neither greater than nor equal to Q
- P&Q means P is neither greater than nor smaller than Q
- P*Q means P is not greater than Q

Statements: A $ M, P @ L, K # P, A $ L

Conclusions:

I. K # L II. A @ P

III.L*A IV.M # P

A. None is true

B. Only I is true

C. Only II is true

D. Only III is true

E. Only IV is true

15. In the following questions, the symbols @, $, %, # and © are used with the following meanings illustrated—

- ‘X @ Y’ means ‘X is not smaller than Y’.
- ‘X $ Y’ means ‘X is not greater than Y’.
- ‘X % Y’ means ‘X is neither smaller than nor equal to Y’.
- ‘X # Y’ means ‘X is neither greater than nor equal to Y’.
- ‘X © Y’ means ‘X is neither smaller than nor greater than Y’.

In the following question assuming the given statements to be true, find out which of the two conclusions I and II given below them is/are definitely true. Give answer

(a)If only I is true.

(b)If only II is true.

(c)If either I or II is true

(d)If neither I nor II is true.

(e)If both I and II are true.

Statement: P $ T, T @ L,U % L

Conclusions: I. P @ L II. U©L

16. Given signs signify something and on that basis, assume the given statements to be true and find which of the two conclusions I and II is/are definitely true.

•A * B means A is not greater than B.

•A │B means A is nether smaller than nor equal to B.

•A / B means A is not smaller than B.

•A \ B means A is neither greater than nor equal to B.

•A ? B means A is neither greater than nor smaller than B.

Statements:

M ? S │ Q │ P, R / P, T \ P

Conclusions:

I) M │ T

II) Q \ R

(a) Only conclusion I is true

(b) Only conclusion II is true

(c) Neither conclusion I nor II is true

(d) Both conclusions I and II are true

17. Given signs signify something and on that basis, assume the given statements to be true and find which of the two conclusions

I and II is/are definitely true.

A+B means A is greater than equal to B

A-B means A is equal to B

A€B means A is less than B

A*B means A is equal to B

A/B means A is greater than equal to B

Statements:

D * G, G – H, H / J

Conclusions:

I) J € D

II) G / J

(a) Only I is true

(b) Only II is true

(c) Both are correct

(d) None of these are true

18. Given signs signify something and on that basis, assume the given statements to be true and find which of the two conclusions I and II is/are definitely true.

A+B means A is equal to B

A-B means A is less than B

A=B means A is not equal to B

A*B means A is greater than equal to B

A/B means A is less than equal to B

Statements:

Q+R, R*S, S–T

Conclusions:

I) S*T

II) Q=R

(a) Only conclusion I is true

(b) Only conclusion II is true

(c) Neither conclusion I nor II is true

(d) Both conclusions I and II are true

Q1.A	**Q2. A**	**Q3. B**	**Q4. D**
Q5.D	**Q6. A**	**Q7. D**	**Q8.C**
Q9.D	**Q10. A**	**Q11.D**	**Q12.D**
Q13.B	**Q14. D**	**Q15. D**	**Q16.A**
Q17. B	**Q18. C**		