The lengths of tangents drawn from an external..

KMV Mohankumar
Subject expert
ZPHS Pachikapallam,
Chittoor.

1 MARK QUESTIONS

1. Find the centroid of the triangle whose vertices are (0,3), (3,0) and (0,0)?

A. Centroid of the triangle is

$$\left(\frac{x_1+x_2+x_3}{2},\frac{y_1+y_2+y_3}{3}\right)$$

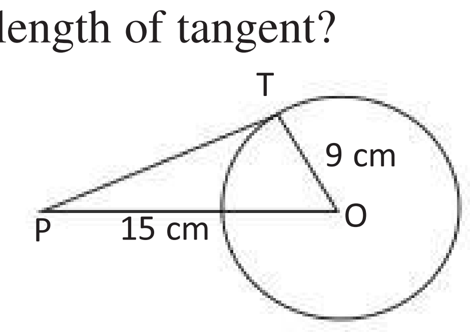
$$\left(\frac{0+3+0}{3},\frac{3+0+0}{3}\right)$$

$$\Rightarrow\left(\frac{3}{3},\frac{3}{3}\right)=(1,1)$$

2. Write two examples of similar pictures and non similar pictures?

A. Similar pictures — Non similar pictures
1. All circles — 1. Square and Rectangle
2. All squares — 2. Rectangle and Paralellogram

3. In the adjacent picture Find the length of tangent?



A. We know that pythogoras Hypotenuse square = sum of squares of other two sides

$\therefore OP^2 = OT^2 + PT^2$

$\Rightarrow PT^2 = OP^2 - OT^2$

$=(15)^2 - (9)^2$

$=225-81=144$

PT= $\sqrt{144}$=12 cm

∴ Length of the tangent is 12cm.

4. If sin A= cos A then find the Value of A?

A. Sin A= Cos A

Divide Cos A both sides

$$\frac{\text{SinA}}{\text{CosA}}=\frac{\text{CosA}}{\text{CosA}}\Rightarrow \text{Tan A}=1$$

Tan A =Tan 45° (∵ tan 45=1)

∴ A= 45°

5. Express sin 81° + tan 81° in terms of trigonometric ratios of angle between 0°& 45°?

A. Sin 81 + Tan 81

= Sin (90-9) + tan(90-9)

= Cos 9°+ Cot 9° (∵ Sin (90-θ) = cos θ

tan (90-θ) =cot θ)

6. If it is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability of 2 students have the same birthday?

A. We know the formula

$$P(E)+P(\bar{E})=1$$

Given that $P(\bar{E})=0.992$

∴ P(E)= Probability of same birthday

$P(E)=1-P(\bar{E})$

⇒ 1–0.992 = 0.118

7. The arithemetic mean of 6, 10, x and 12 is 8. Then find the value of x?

A. We know that mean = $\frac{\text{Sum of observations}}{\text{No.of observations}}$

$$8=\frac{6+10+x+12}{4}\Rightarrow 32 = 28 + x$$

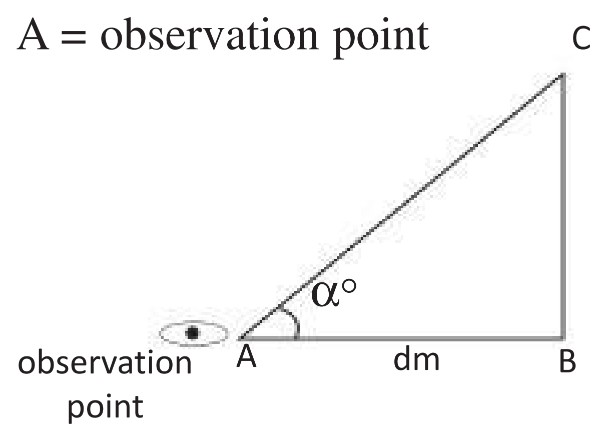
x = 32 - 28 =4

∴ x = 4

8. The top of a clock tower is observed at angle of elevation of α° and the foot of the tower is at the distance of d meters from the observer. Draw the diagram for the data.

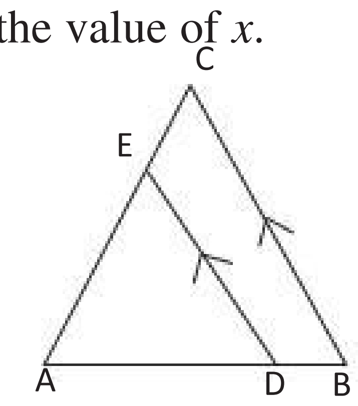
A. BC = Tower of clock

A = observation point

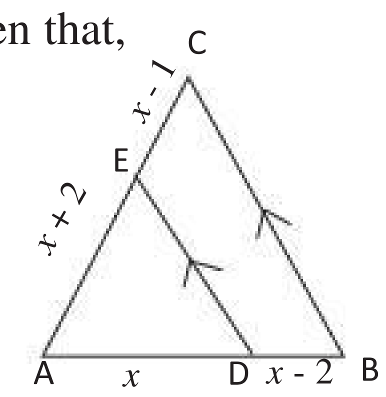


2 MARKS QUESTIONS

1. In Δ ABC, DE//BC, AD=x, DB= x-2, AE=x+2 and Ec = x -1. Find the value of x.



A. Given that,



In ΔABC

DE//BC and DB = x-2, AD = x

AE = x +2 and EC = x -1

We know that the Basic Proportional theorem.

$$\frac{AE}{EC}=\frac{AD}{DB}$$

$$\Rightarrow\frac{x+2}{x-1}=\frac{x}{x-2}$$

= (x+2) (x-2) = x (x -1)

= x^2-4 = x^2- x

= x = 4

2. If A, B and C are interior angles of a triangle ABC then show that $\text{Tan}\left(\frac{B+C}{2}\right)=\cot\frac{A}{2}$

A. We know that sum of interior angles of triangle is 180°

∴ ∠A+∠B+∠C=180°

∠B+∠C = 180 –∠A

divide 2 on both sides

$$\frac{B+C}{2}=90-\frac{A}{2},$$

apply tan on both sides

పదో తరగతి
MATHEMATICS
ప్రత్యేకం

$$\tan\left(\frac{B+C}{2}\right)=\tan\left(90-\frac{A}{2}\right)$$

$$\tan\left(\frac{B+C}{2}\right)=\cot\frac{A}{2}$$

3. Write the formula of Median for a grouped data and explain each term.

A. Median = $l+\left[\frac{\frac{N}{2}-CF}{f}\right]h$

where l = lower boundary of Median class

n = No of observations

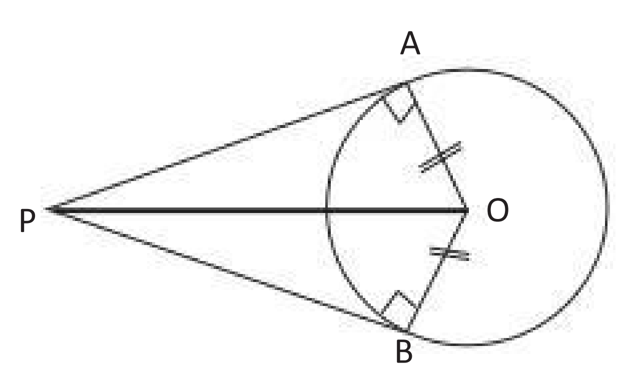
cf = cumulative frequency of class preceeding the median class

f = frequency of Median class

h = class size

4. Prove that the lengths of tangents drawn from an external point to a circle are equal.

A. Given: A circle with centre 'o' P is a point (External point) and PA and PB are two tangents.



R.T.P: PA= PB

Construction: Join $\overline{PO}$ and $\overline{OA}$ and $\overline{OB}$

Proof: In triangles OAP and OBP

∠OAP = ∠OBP = 90 (Radii & tangent)

$\overline{OA}$= $\overline{OB}$ (same radii)

OP = OP (common angle)

By R.H.S congruency

ΔOAP ≅ Δ OBP

By CPCT , PA = PB.

5. Prove that $\sqrt{\frac{1-\text{Sin}\,\theta}{1+\sin\theta}}=\sec\theta-\tan\theta$

A. L.H.S given that $\sqrt{\frac{1-\text{Sin}\theta}{1+\text{Sin}\theta}}$

Rationalise the denominator

$$=\sqrt{\frac{1-\text{Sin}\theta}{1+\text{Sin}\theta}}\sqrt{\frac{1-\text{Sin}\theta}{1-\text{Sin}\theta}}$$

$$=\sqrt{\frac{(1-\text{Sin}\theta)^2}{1-\text{Sin}^2\theta}}\Rightarrow\frac{\sqrt{(1-\sin\theta)^2}}{\sqrt{\cos^2\theta}}$$

$$=\frac{1-\text{Sin}\theta}{\text{Cos}\theta}=\frac{1}{\text{Cos}\theta}-\frac{\text{Sin}\theta}{\text{Cos}\theta}$$

Cosecθ–tanθ = R.H.S

$$\therefore\sqrt{\frac{1-\text{Sin}\theta}{1+\text{Sin}\theta}}=\text{Cosec}\,\theta-\tan\theta$$

6. Find the value of K for which the points A(1,2), B(-1,k), C(-3,-4) are collinear.

A. We know that if the given three points are collinear then area of the corresponding triangle is O.

∴ Ar Δ ABC is O;

given points

$(1,2),(-1,k,)(-3,-4,)$ with $x_1\,y_1$, $x_2\,y_2$, $x_3\,y_3$

Area of the triangle =

$$\frac{1}{2}\left|x_1(y_2-y_3)+x_2(y_3-y_1)\right.$$

$$\left.+x_3(y_1-y_2)\right|$$

$$\therefore\frac{1}{2}\left|x_1(y_2-y_3)+x_2(y_3-y_1)\right.$$

$$\left.+x_3(y_1-y_2)\right|=0$$

$$\left|1(K+4)-1(-4-2)-3(2-K)\right|=0$$

$$\left|K+4+6-6+3K\right|=0$$

4K+4=0

K= -1

7. If two dice thrown, then what is probability of

(i) atleast one 5 come up

(ii) 5 will not come up?

A. If two dice are thrown then total possible out comes are =36

∴ n(s) =36

Sample space of at least one five=

$$\{(1,5),(2,5),(3,5),(4,5),(5,5),$$

$$(6,5),(5,1)(5,2),(5,3),(5,4),(5,6)\}$$

∴ Favourable out comes of at least one five =11

∴ n(E) =11

We know that P(E) =

$$\frac{\text{Favourable out comes}}{\text{Total possible out comes}}=\frac{n(E)}{n(S)}$$

(i) P (atleast one 5 come up) = 11/36

(ii) P (Not a 5 come up) = $P(\bar{E})$

We know that the formula

$$P(A)=P(\bar{E})=1$$

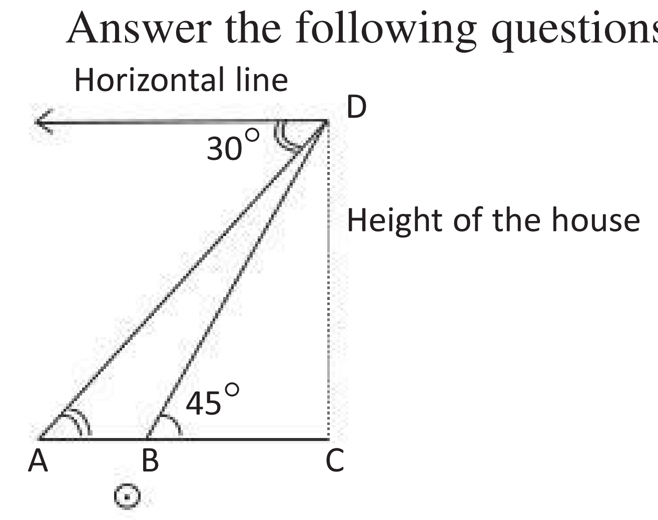
$$\Rightarrow P(5)+P(\bar{5})=1$$

$$\therefore P(\bar{5})=1-P(5)$$

$$\Rightarrow 1-\frac{11}{36}=\frac{36-11}{36}$$

$$\therefore P(\bar{5})=\frac{25}{36}$$

8. Read the picture carefully and Answer the following questions.



(i) What is the angle of elevation?

(ii) What is the angle of depression?

(iii) What is angle A (∠A)?

(iv) DC represents

A. (i) Angle of Elevation is =45°

(ii) Angle of depression = 30°

(iii) ∠A= 30°

(iv) BC represents height of the house