



# MATHS

## BOOKS - AGRAWAL PUBLICATION

### Sample paper 9

#### Exercise

1. Explain why  $3 \times 5 \times 7 + 7$  is a composite number.



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2. Find the distance of the point  $(7,-8)$  from the origin



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3. Find the ratio in which the line segment joining the points  $(-1,7)$  and  $(4,-3)$  is divided by the point  $(1,3)$ .



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4. For the following distribution, find the sum of the lower limits of the median class and the modal

class:

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9



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5.  $\triangle ABC$  is an equilateral triangle such that  $AD \perp BC$ , then  $AD^2 =$



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6. An equilateral triangle  $ABC$  is inscribed in a circle with centre  $O$ . The measures of  $\angle BOC$  is  $30^\circ$   
(b)  $60^\circ$  (c)  $90^\circ$  (d)  $120^\circ$



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7. If  $2 \cos 3\theta = \sqrt{3}$  ( $0^\circ \leq \theta \leq 90^\circ$ ), then find the value of  $\theta$ .



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8. What is the perimeter of triangle with vertices  $(0,0)$ ,  $(1,0)$  and  $(0,1)$ .



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9. On melting a solid sphere of lead of radius 8 cm , find the number of spherical balls of radius 1 cm that can be made?



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10. If the area of a sector of a circle of radius 2 cm is  $\pi$  sq m, then what is the central angle of the sector ?



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11. If 18,  $a$ ,  $b$ ,  $-3$  are in AP, then  $a + b =$



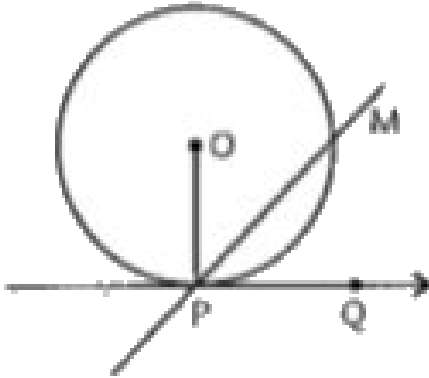
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12. In  $\triangle ABC$ ,  $D$  and  $E$  are points on the sides  $AB$  and  $AC$  respectively, such that  $DE \parallel BC$ . If  $AD=2.5\text{cm}$ ,  $BD=3\text{cm}$  and  $AE = 3.75\text{ cm}$ , then the value of  $AC$ .



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13. In the given figure ,if  $\angle MPQ = 40^\circ$  , then find the  $\angle OPM$ .



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14. Write the empirical relation between mean, mode and median.

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**15.** If the product of the zeros of the polynomial  $ax^2 - 6x - 12$  is 4 , then find the value of 'a' .



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**16.** In an A.P., If  $a=21$  ,  $d=-3$  and  $a_n = 0$  , then find the value of 'n' .



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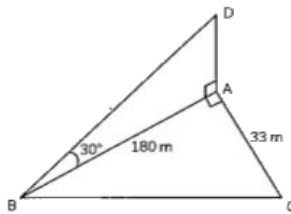
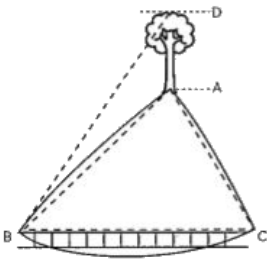
**17.** Write a quadratic equation whose zeros are -7 and 5.





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18. A playgroup school is looking to refurbish the playground area that is in almost a triangular shape (ABC). There is a small tree, almost a vertical line in shape lets say AD, at the corner of the playground area



A path runs along the edge BC of the field. As part of material purchase planning, the playgroup manager needs to scope out the surrounding area

including the dimensions of the tree.

The height of the tree AD is :

A.  $29\sqrt{3}m$

B.  $38\sqrt{3}m$

C.  $43\sqrt{3}m$

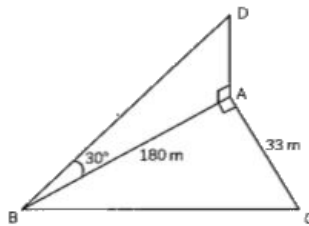
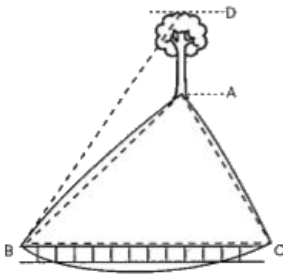
D.  $60\sqrt{3}m$

**Answer:**



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19. A playgroup school is looking to refurbish the playground area that is in almost a triangular shape (ABC). There is a small tree, almost a vertical line in shape lets say AD, at the corner of the playground area



A path runs along the edge BC of the field. As part of material purchase planning, the playgroup manager needs to scope out the surrounding area including the dimensions of the tree.

On the basis of the above information, answer any

four of the following questions :

The length of the path BC is :

A. 193 m

B. 189 m

C. 188m

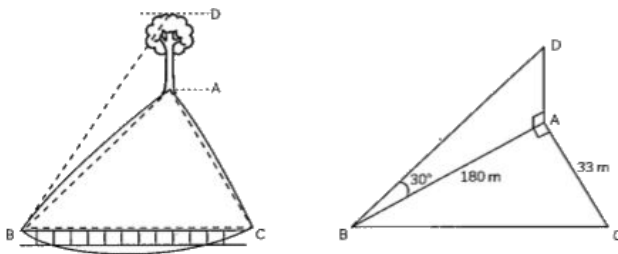
D. 183 m

**Answer:**



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20. A playgroup school is looking to refurbish the playground area that is in almost a triangular shape (ABC). There is a small tree, almost a vertical line in shape lets say AD, at the corner of the playground area



A path runs along the edge BC of the field. As part of material purchase planning, the playgroup manager needs to scope out the surrounding area including the dimensions of the tree.

On the basis of the above information, answer any

four of the following questions :

The area (in sq m) of the field ABC is :

A. 2790 sq m

B. 2970 sq m

C. 3102 sq m

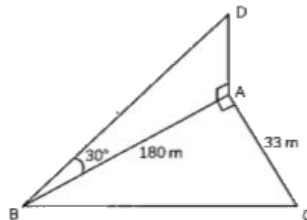
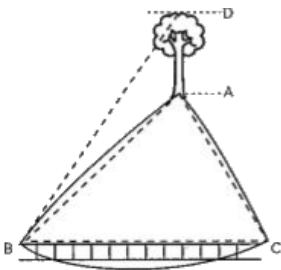
D. 3210 sq m

**Answer:**



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21. A playgroup school is looking to refurbish the playground area that is in almost a triangular shape (ABC). There is a small tree, almost a vertical line in shape lets say AD, at the corner of the playground area



A path runs along the edge BC of the field. As part of material purchase planning, the playgroup manager needs to scope out the surrounding area including the dimensions of the tree.

The length BD is :

A. 198 m

B. 208 m

C. 228 m

D. 243 m

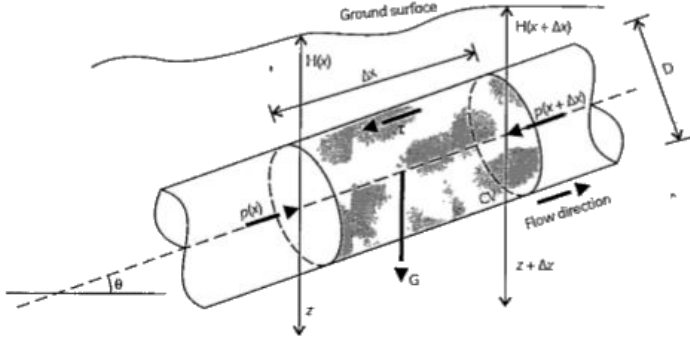
**Answer:**



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**22.** In CERN , some work is carried out for developing an accurate and fast numerical method that can calculate natural gas flow in a pipeline under non isothermal steady -state conditions .





The cross section of the pipeline is shown below:

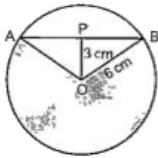


Diagram 1

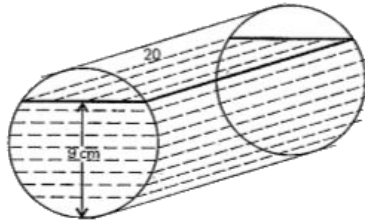


Diagram 2

In Diagram 1, O is the centre of the circle of radius 6 cm and P is the mid-point of the chord AB. The length OP is 3 cm.

The measure of  $\angle AOB$  is :

A.  $60^\circ$

B.  $75^\circ$

C.  $120^\circ$

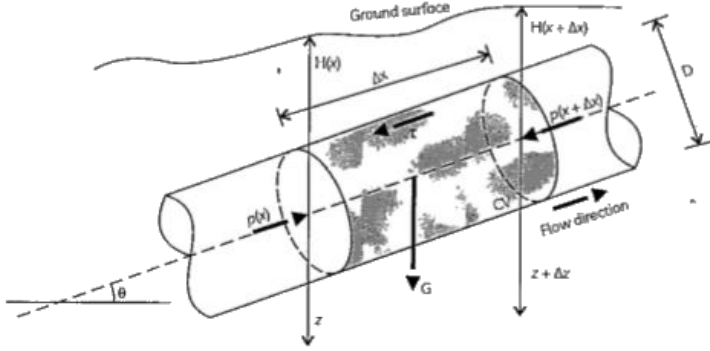
D.  $135^\circ$

**Answer:**



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**23.** In CERN , some work is carried out for developing an accurate and fast numerical method that can calculate natural gas flow in a pipeline under non isothermal steady -state conditions .



The cross section of the pipeline is shown below:

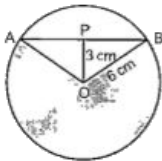


Diagram 1

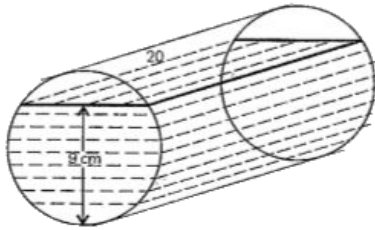


Diagram 2

In Diagram 1, O is the centre of the circle of radius 6 cm and P is the mid-point of the chord AB. The length OP is 3 cm.

The area (in sq cm) of  $\triangle AOB$  is :

A. 5.2

B. 10.4

C. 15.6

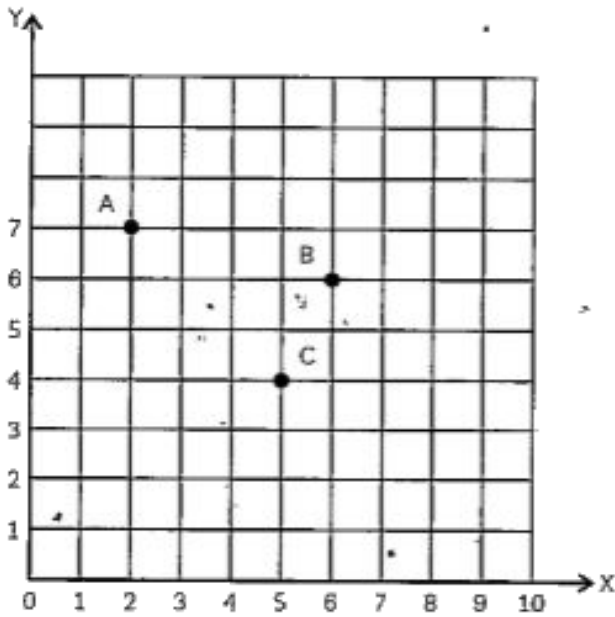
D. 20.8

**Answer:**



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**24.** Resident Welfare Association (RWA) of a M2 K Society in Azadpur have put up three electric poles A,B and C in a society 's common park near Tower A . Despite these poles ,some parts of the park are still in dark. So , RWA decides to have one more electron pole D in the park.



The position of the pole C is :

A. (5,4)

B. (2,7)

C. (8,9)

D. (9,8)

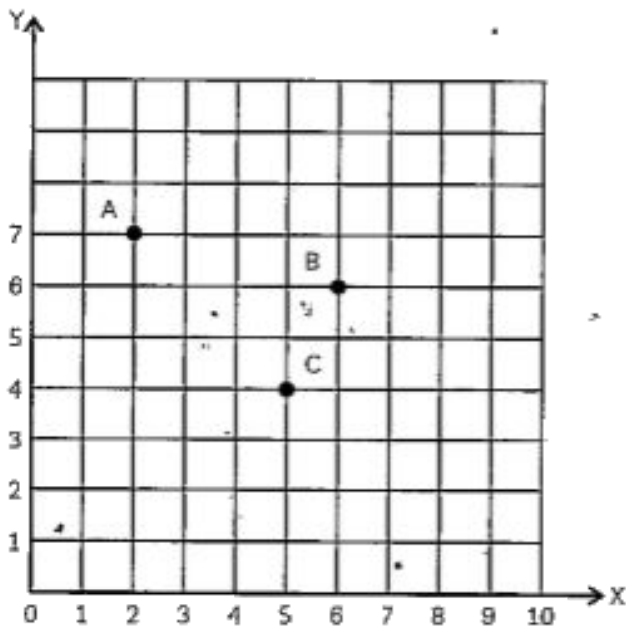
**Answer:**



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**25.** Resident Welfare Association (RWA) of a M2 K Society in Azadpur have put up three electric poles A,B and C in a society 's common park near Tower A . Despite these poles ,some parts of the park are still in dark. So , RWA decides to have one more

electron pole D in the park.



The distance of the pole B from the corner O of the park is :

A.  $\sqrt{53}$  units

B.  $\sqrt{41}$  units

C.  $\sqrt{72}$  units

D.  $\sqrt{145}$  units

**Answer:**

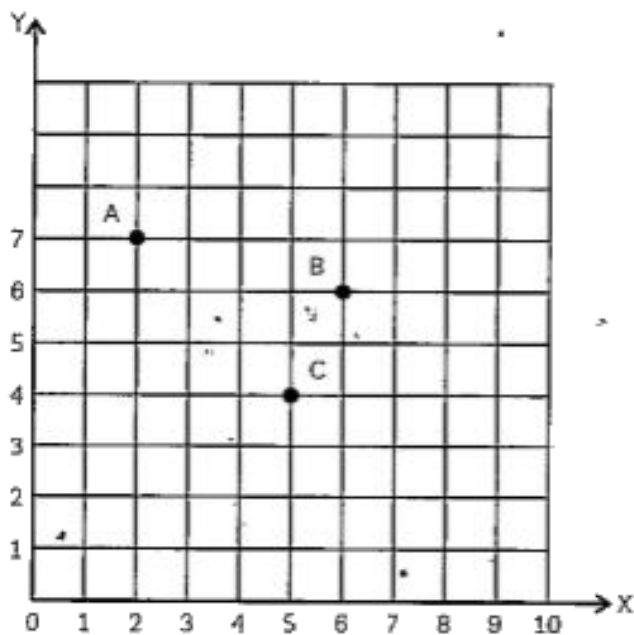


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**26.** Resident Welfare Association (RWA) of a M2 K Society in Azadpur have put up three electric poles A, B and C in a society 's common park near Tower A . Despite these poles ,some parts of the park are



still in dark. So , RWA decides to have one more electron pole D in the park.



The position of the fourth pole D so that four points A,B,C and D form a parallelogram is :

A. (1,4)

B. (1,5)

C. (2,3)

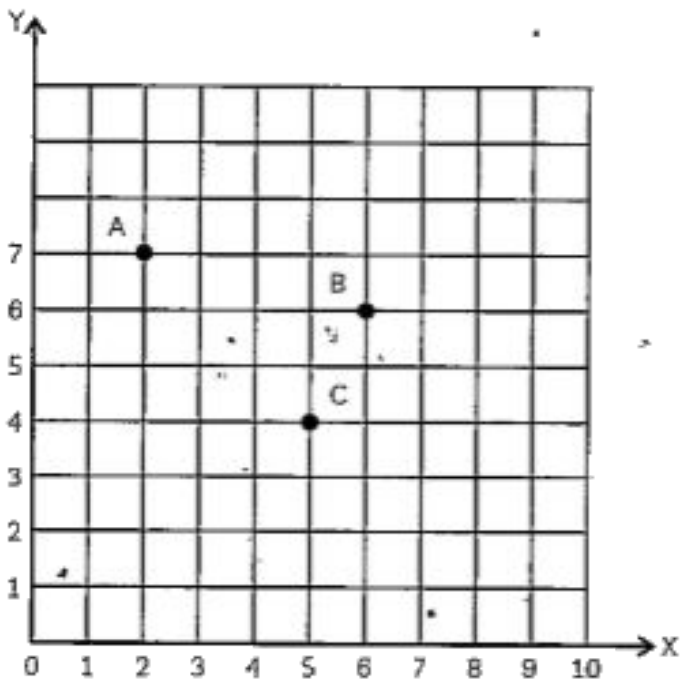
D. (5,1)

**Answer:**



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**27.** Resident Welfare Association (RWA) of a M2 K Society in Azadpur have put up three electric poles A,B and C in a society 's common park near Tower A . Despite these poles ,some parts of the park are still in dark. So , RWA decides to have one more electron pole D in the park.



On the basis of the above information ,answer any

four of the following questions :

The distance between poles A and C is :

A.  $\sqrt{18}$  units

B.  $\sqrt{17}$  units

C.  $\sqrt{5}$  units

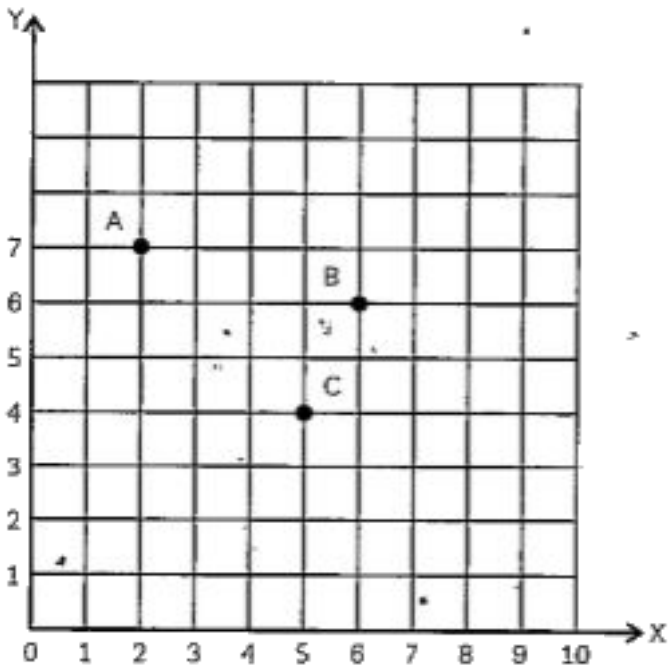
D.  $\sqrt{34}$ units

**Answer:**



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**28.** Resident Welfare Association (RWA) of a M2 K Society in Azadpur have put up three electric poles A,B and C in a society 's common park near Tower A . Despite these poles ,some parts of the park are still in dark. So , RWA decides to have one more electron pole D in the park.



Plot a point D so that ABCD becomes parallelogram

.The distance between poles B and D is :

A.  $\sqrt{24}$  units

B.  $\sqrt{17}$  units

C.  $\sqrt{5}$  units

D.  $\sqrt{26}$  units

**Answer:**



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**29.** Write any two irrational numbers whose product is rational number.



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30. If the zeroes of the polynomial  $x^3 - 3x^2 + x + 1$  are  $a, b, a + b$ , find  $a$  and  $b$ .



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31. Given the linear equation  $2x + 3y - 8 = 0$ , write another linear equation in two variables such that the geometrical representation of the pair so formed is (i) intersecting lines (ii) Parallel lines (iii) coincident lines



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**32.** Given the linear equation  $2x + 3y - 8 = 0$ , write another linear equation in two variables such that the geometrical representation of the pair so formed is coincident lines



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**33.** The product of A's age 5 years ago with his age 9 years later is 15. Find A's present age .



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34. If  $x = r \sin A \cos C$ ,  $y = r \sin A \sin C$  and  $z = r \cos A$ , prove that  $r^2 = x^2 + y^2 + z^2$



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35.

Prove

$$(\tan \theta + 2)(2 \tan \theta + 1) = 5 \tan \theta + 2 \sec^2 \theta.$$



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36. A cow is tied with a rope of length 14m at the corner of a rectangular field of dimensions

$20m \times 16m$  . Find the area of the field in which the cow can graze.



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37. Prove that  $\sqrt{3}$  is an irrational number



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38. Find the roots of the equation :

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30} \quad (x \neq -4, 7)$$



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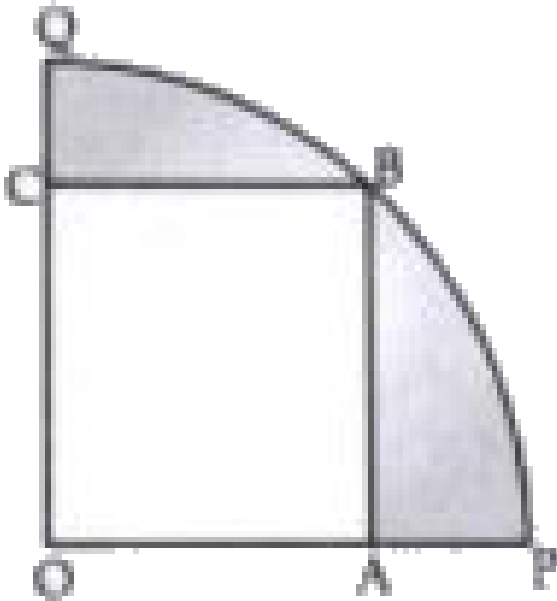
**39.** Find a fraction which becomes  $\frac{1}{2}$  when the denominator is increased by 4, and  $\frac{1}{8}$  when the numerator is decreased by 5.



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**40.** In the given figure, a square OABC is inscribed in a quadrant OPBQ. If  $OA = 20$  cm, find the area of

the shaded region (Use  $\pi = 3.14$ )



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**41.** Draw a circle of radius 3 cm. From a point 5 cm from the centre of the circle, draw two tangents to the circle. Measure the length of each tangent.



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42. State and prove the Pythagoras theorem.

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43. The annual rainfall record of a city for 66 days is given below in the table :

Rainfall (in cm)	0-10	10-20	20-30	30-40	40-50	50-60
Number of days	22	10	8	15	5	6

Calculate the median rainfall ,using the formula .

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44. Prove that

$$\frac{\cot \theta + \operatorname{cosec} \theta - 1}{\cot \theta - \operatorname{cosec} \theta + 1} = \frac{1 + \cos \theta}{\sin \theta}.$$



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45. Prove that

$$\frac{\tan A}{(1 - \cot A)} + \frac{\cot A}{(1 - \tan A)} = (1 + \tan A + \cot A).$$



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46. If the sum of the zeros of the polynomial

$2x^2 + 3kx + 3$  is 6, then find the value of  $k$ .







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47. When a pair of linear equations is said to be inconsistent?



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48. Find the roots of the quadratic equation  
 $(3x - 5)(x + 3) = 0$ .



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**49.** Find the sum of natural numbers from 51 to 100.



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**50.** Find the  $8^{th}$  term from the end of the A.P.  
 $-12, -7, -2, \dots, 68$



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**51.** How many terms of AP:  $18, 16, 14, \dots$  make the sum zero?



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52. For what value of  $a$  is  $-4$  zero of the polynomial  $p(x) = x^2 - x - (2a + 2)$ ?



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53. If  $A(6, 2)$ ,  $B(4, 2)$  and  $C(6, 4)$  are the vertices of  $\triangle ABC$ , then find the length of the median through  $C$ .



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**54.** The base PQ of two equilateral triangles PQR and PQR with side 2a lies along y-axis such that the mid-point of PQ is at the origin. Find the coordinates of the vertices R and R of the triangles.



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**55.** In a  $\triangle ABC$ , if DE is parallel to BC,  $\frac{AD}{DB} = \frac{3}{4}$  and AC = 15 cm, then find the length AE.



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**56.** If the bisector of an angle of a triangle bisects the opposite side, prove that the triangle is isosceles.



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**57.** Draw a line segment of length 7 cm and divide it in the ratio 2:3.



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**58.** Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.



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**59.** Write the formula for the area of a sector of angle  $\theta$  (in degrees) of a circle of radius  $r$ .



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**60.** If the perimeter of a semicircular protractor is 36cm, find its diameter.



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**61.** If  $P(E) = 0.005$ , then find the probability of "not E".



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**62.** An unbiased dice is rolled once. What is the probability of getting an even prime number?



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63. If  $\sin B = 0.5$ , find the value of  $3 \cos B - 4 \cos^3 B$



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64. Find the value of  $\operatorname{cosec}^2 30^\circ \sin^2 45^\circ - \sec^2 60^\circ$



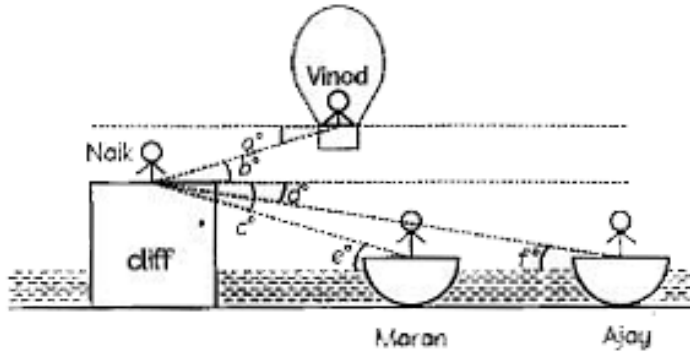
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**65.** Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

The main goal is to scope out the range and angles at which they should train their soldiers.

Which one is a pair of 'angles of elevation'?



- A. ( $Za^\circ$ ,  $Ze^\circ$ )
- B. ( $Zb^\circ$ ,  $Ze^\circ$ )
- C. ( $Zc^\circ$ ,  $Zd$ )
- D. ( $Za^\circ$ ,  $Zf^\circ$ )

**Answer:**

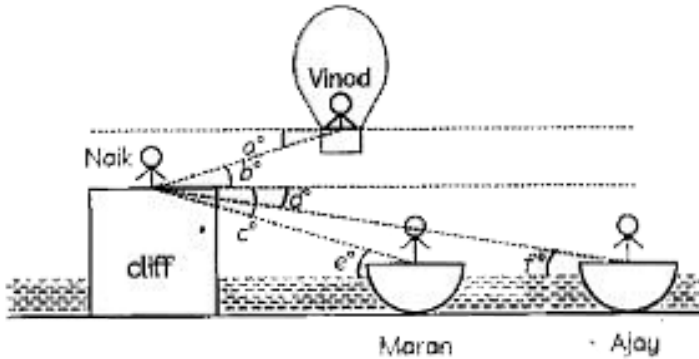


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**66.** Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

The main goal is to scope out the range and angles at which they should train their soldiers.

which one is a pair of 'angles of depression'?



A. ( $Za^\circ$ ,  $Ze^\circ$ )

B. ( $Zb^\circ$ ,  $Ze^\circ$ )

C. ( $Zc^\circ$ ,  $Zd^\circ$ )

D. ( $Za^\circ$ ,  $Zf^\circ$ )

**Answer:**



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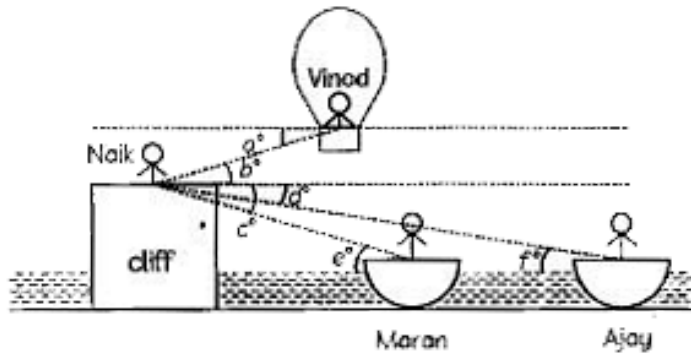
**67.** Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

The main goal is to scope out the range and angles at which they should train their soldiers.

Ajay's boat is 25 m away from the base of the cliff.

If  $\angle d = 30^\circ$ . What is the height of the cliff? (use

$$\sqrt{3} = 1.73)$$



- A. 17.5 m
- B. 12.26 m
- C. 14.45 m
- D. 15.4 m

**Answer:**



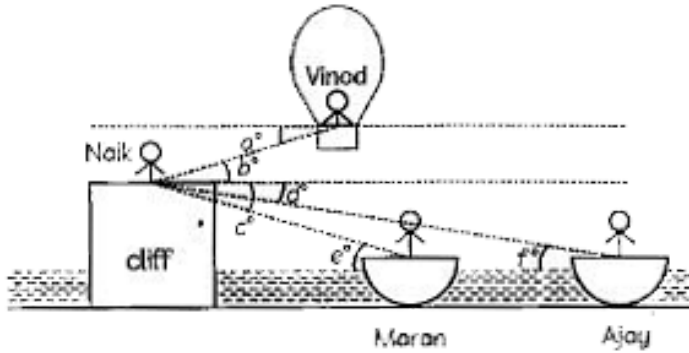
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**68.** Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.

The main goal is to scope out the range and angles at which they should train their soldiers.

If the height of the cliff is  $30m$ ,  $\angle c = 45^\circ$  and  $\angle d = 30^\circ$ , distance between the two boats is

(use  $(\sqrt{3} = 1.73)$ )



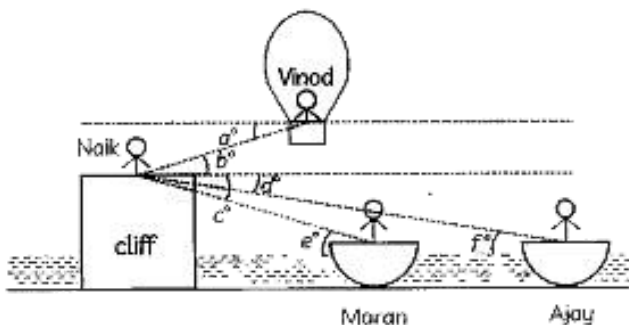
- A. 6.8 m
- B. 8.5 m
- C. 11.2 m
- D. 21.9 m

**Answer:**

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69. Mr. Naik is a paramilitary Intelligence Corps officer who is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Vinod is on a hot air balloon in the sky. When Mr. Naik looks down below the cliff towards the sea, he has Ajay and Maran in boats positioned to get a good vantage point.



The main goal is to scope out the range and angles at which they should train their soldiers.

If the vertical height of the balloon from the top of the cliff is 12 m and  $\angle b = 30^\circ$ , then the distance between the Naik and vinod is

A. 6m

B. 12m

C. 18 m

D. 24 m

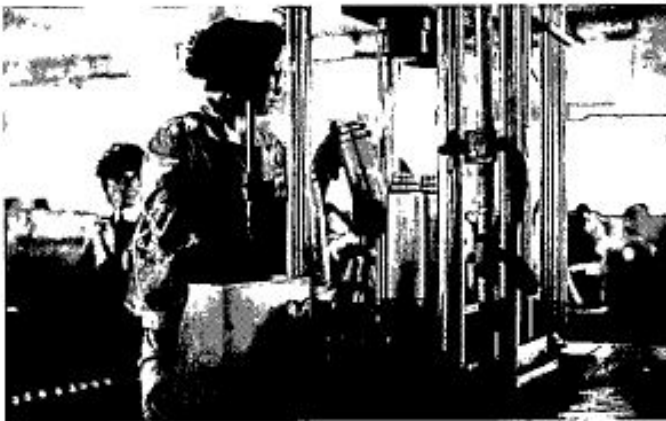
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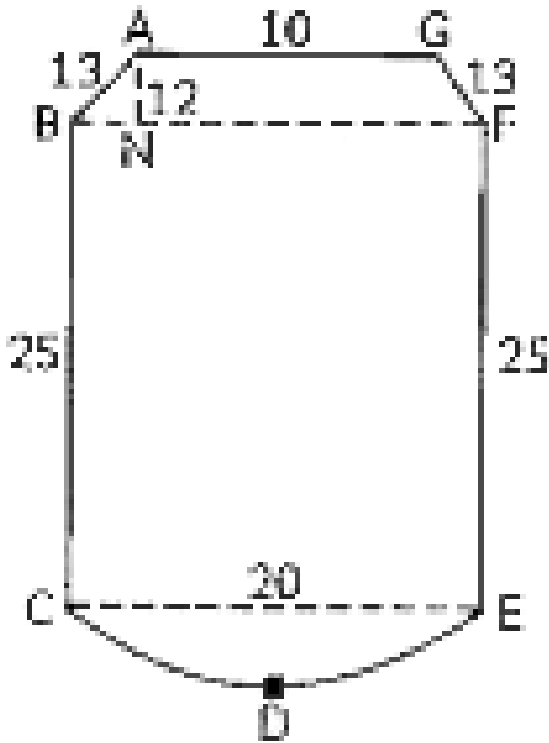


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70. Thermas Housewares Co. Ltd is one of the leading brands in the field of vacuum flask. They are producing a new high-quality heat preservation flask series and the below figure shows the cross - section of the interior part of a new concept thermos flask.

The top part is a trapezium, the middle part is a rectangle and the bottom part is a semi-circle





The dimension of various parts are:

$CE = 20$  cm,  $BC = 25$  cm,  $AB = GF = 13$  cm,  $AG = 10$  cm

and  $AN = 12$  cm

The perimeter of the trapezium part of the cross section, is

A. 36 cm

B. 56 cm

C. 30 cm

D. 46 cm

**Answer:**

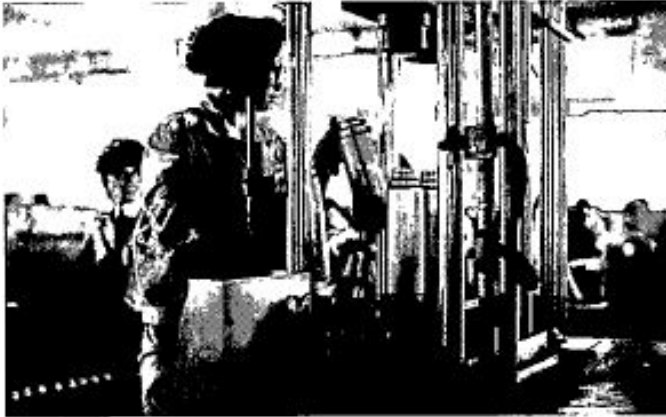


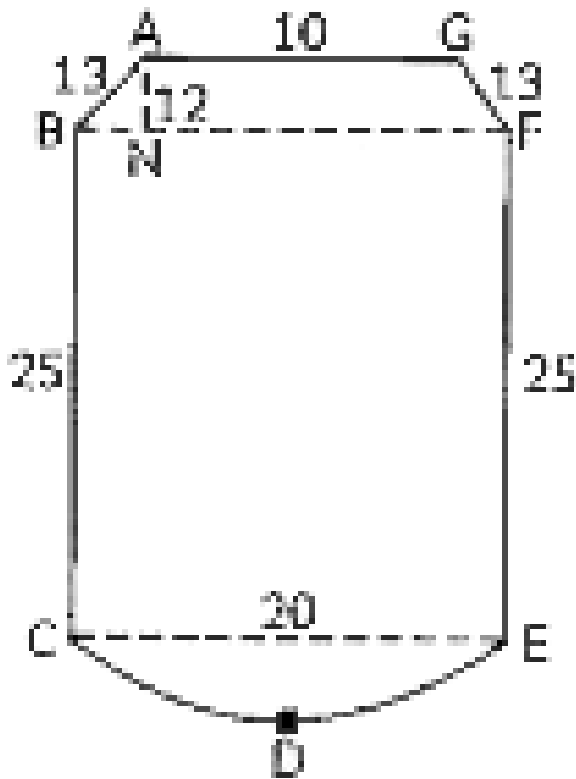
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**71.** Thermas Housewares Co. Ltd is one of the leading brands in the field of vacuum flask. They are producing a new high-quality heat preservation flask series and the below figure shows the cross -

section of the interior part of a new concept  
thermos flask.

The top part is a trapezium, the middle part is a  
rectangle and the bottom part is a semi-circle





The dimension of various parts are:

$CE = 20$  cm,  $BC = 25$  cm,  $AB = GF = 13$  cm,  $AG = 10$  cm

and  $AN = 12$  cm

The perimeter of the rectangular part of the cross section, is

A. 90 cm

B. 70 cm

C. 50 cm

D. 40 cm

**Answer:**



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**72.** Using prime factorisation, find the HCF and LCM of 150 and 240.



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**73.** Find the ratio in which the line segment joining the points  $(-3, 10)$  and  $(6, -8)$  is divided by  $(-1, 6)$ .



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**74.** Using distance formula, show that the points  $A(1, -1)$ ,  $B(5, 2)$  and  $C(9, 5)$  are collinear.



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**75.** Rasheed got a playing top (lattu) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diamete



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**76.** In an A.P., the last term is 28 and the sum of all the 9 terms of the A.P. is 144. Find the first term.



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**77.** In what ratio does the x-axis divide the line segment joining the points  $(-4,-6)$  and  $(-1,7)$ ? Find the co-ordinates of the point of division.



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**78.** Prove that the parallelogram circumscribing a circle is a rhombus.



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**79.** The diagonal  $BD$  of a parallelogram  $ABCD$  intersects the segment  $AE$  at the point  $F$ , where  $E$  is any point on the side  $BC$ . Prove that  $DF \times EF = FB \times FA$ .



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**80.** In the given figure, are shown two arcs  $PAQ$  and  $PBQ$ . Arc  $PAQ$  is a part of circle with centre  $O$  and radius  $OP$  while arc  $PBQ$  is a semi-circle drawn on  $PQ$  as diameter with centre  $M$ . If  $PQ = OP = 10$  cm show that area of shaded region is  $25\left(\sqrt{3} - \frac{\pi}{6}\right)$ .



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**81.** A Hollow cone is cut by a plane parallel to the base and upper portion is removed. If the curved surface of the remainder is  $\frac{8}{9}$  of the curved surface of the whole cone; find the ration of the line-segment into which the cone's altitude is divided by the plane.

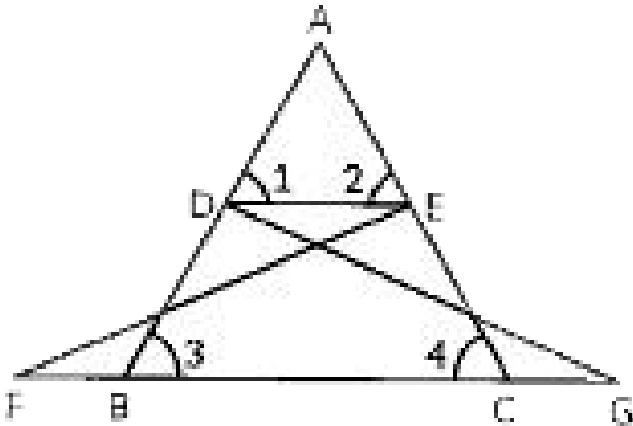


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**82.** A two digit number is four times the sum and three times the product of its digits.

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83. In the given figure,  $\triangle FEC$  is congruent to  $\triangle GDB$  and  $\angle 1 = \angle 2$ . Prove that  $\triangle ADE \sim \triangle ABC$



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84. If an isosceles triangle  $ABC$  in which  $AB = AC = 6\text{cm}$  is inscribed in a circle of radius  $9\text{cm}$ , find the area of the triangle.



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85. From an aeroplane vertically above a straight horizontal road, the angles of depression of two consecutive mile stones on opposite sides of the aeroplane are observed to be  $\alpha$  and  $\beta$ . Show that the height in miles of aeroplane above the road is

give by  $\frac{\tan \alpha \tan \beta}{\tan \alpha + \tan \beta}$



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