



# MATHS

## BOOKS - AGRAWAL PUBLICATION

### SAMPLE PAPER 7

#### Exercise

1. Two positive integers  $p$  and  $q$  are expressible as  $p = a^3b$  and  $q = ab^2$ . Find the HCF ( $p,q$ ) and LCM( $p,q$ ).



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2. Check whether  $-150$  is a term of the A.P:

$11, 8, 5, 2, \dots$



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3. The roots of the equation

$2x^2 - 6x + 3 = 0$  are



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4. Find the solution of the pair of equations :

$$2x + 3y = 9$$

$$3x + 4y = 5.$$



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5. Two vertices of a triangle are (4,-5) and (-5,-2). If the centroid of the triangle of the origin determine the third vertex of the triangle.



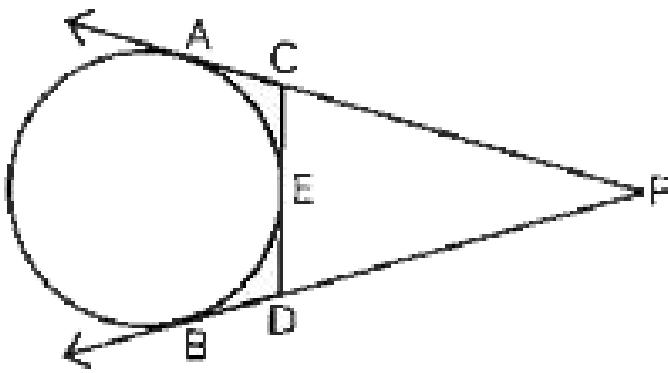
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6. What is mid - point of line segment AB, where A (-5,0) and B(0,5) ?



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7. In the adjoining figure, if  $PA=10$  cm, then find the perimeter of  $\triangle PCD$ .



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8. If  $x \sec 45^\circ = 2$ , then what is the value of  $x$ .

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9. If  $\tan \theta + \cot \theta = 4$ , then find the value of  $\tan^4 \theta + \cot^4 \theta$ .



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10. Prove that :  $\frac{\sin i}{1 + \cos i} = \frac{1 - \cos i}{\sin i}$



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11. In an A.P., if  $a = 3.5$ ,  $d = 0$ ,  $n = 101$ , then find the value of  $a_n$ .



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12. If  $A=900$ ,  $\sum f_i d_l = -400$  and  $\sum f_i = 100$ , then what is the value of  $\bar{x}$  ?



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13. A 6 faced cube has letters A,B,C,D,A and C on its six faces. This cube is rolled once. What is the probability of getting B or C ?



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**14.** A letter is chosen from letters of the word MAINTENANCE. What is the probability that it is N ?



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**15.** If the equation  $x^2 + 4x + k = 0$  has real and distinct roots, then find the value of 'k'.



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**16.** Examine if 1 and 2 are zeros of the polynomial  $p(x) = x^3 - 3x^2 - x + 3$ .



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**17.** Which term of the A.P. -2,-7,-12, . . . will be -77 ?



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**18.** What type of lines are represented by the pair of equations :

$$10x + 6y = 9 \text{ and } 5x + 3y + 4 = 0 ?$$



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**19.** If an event is sure to occur, then what is its probability of occurrence ?



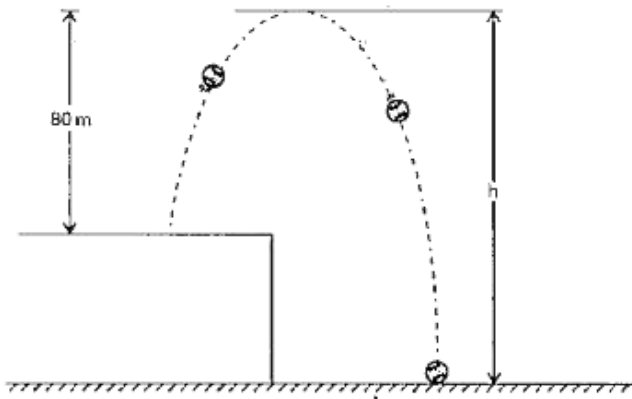
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**20.** The decimal expansion of the rational number  $\frac{14587}{1250}$  will terminate after:



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21. Soumya throws a ball upwards, from a rooftop, 80 m above. It will reach a maximum height and then fall back to the ground. The height of the ball from the ground at time 't' is 'h', which is given by  $h = -16t^2 + 64t + 80$



What is the height reached by the ball after 1 second ?

A. 135 m

B. 140 m

C. 128 m

D. 145 m

**Answer:**

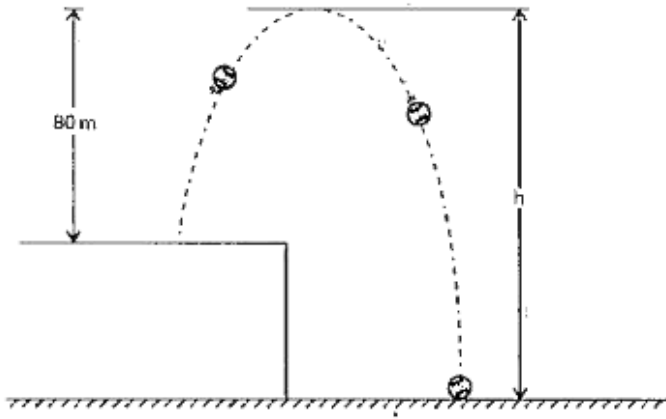


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**22.** Soumya throws a ball upwards, from a rooftop, 80 m above. It will reach a maximum height and then fall back to the ground. The

height of the ball from the ground at time 't' is

'h', which is given by  $h = -16t^2 + 64t + 80$



What is the maximum height reached by the ball ?

A. 154 m

B. 144 m

C. 136 m

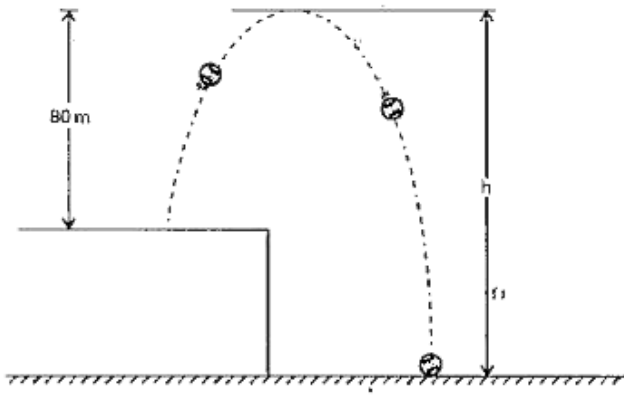
D. 158 m

**Answer:**



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**23.** Soumya throws a ball upwards, from a rooftop, 80 m above. It will reach a maximum height and then fall back to the ground. The height of the ball from the ground at time 't' is 'h', which is given by  $h = -16t^2 + 64t + 80$



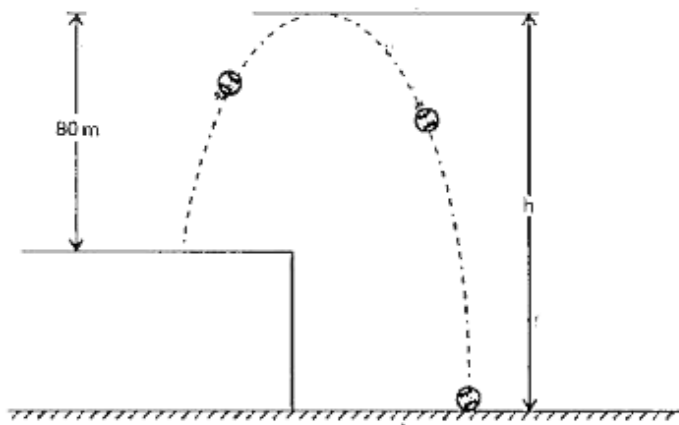
How long will the ball take to hit the ground ?

- A. 4 seconds
- B. 3 seconds
- C. 5 seconds
- D. 6 seconds

**Answer:**



24. Soumya throws a ball upwards, from a rooftop, 80 m above. It will reach a maximum height and then fall back to the ground. The height of the ball from the ground at time 't' is 'h', which is given by  $h = -16t^2 + 64t + 80$





What are the two possible times to reach the ball at the same height of 128 m ?

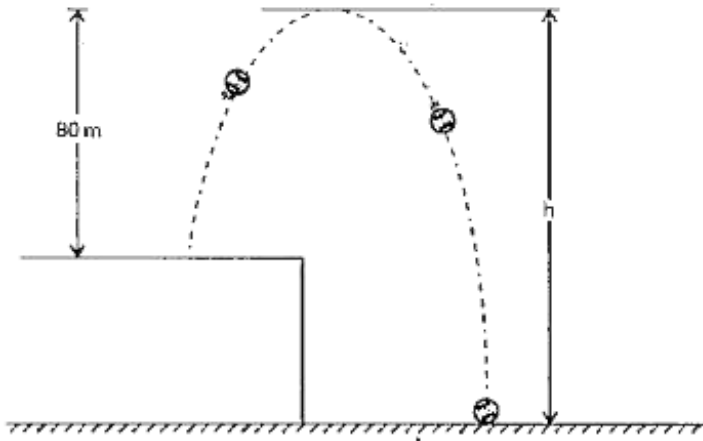
- A. 1 and 3 seconds
- B. 1.5 and 2.5 seconds
- C. 0.5 and 2.5 seconds
- D. 1.6 and 2.6 seconds

**Answer:**



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25. Soumya throws a ball upwards, from a rooftop, 80 m above. It will reach a maximum height and then fall back to the ground. The height of the ball from the ground at time 't' is 'h', which is given by  $h = -16t^2 + 64t + 80$



After 6 seconds, where is the ball ?

A. At the ground

B. rebounds

C. at highest point

D. fall back

**Answer:**



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**26.** Assuming that  $\sqrt{2}$  is irrational, show that

$5 + \sqrt{2}$  is an irrational number.



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27. Find the greatest number that divides 45 and 240 completely.



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28. If  $x = a \cos^3 \theta$  and  $y = b \sin^3 \theta$ , prove

that  $\left(\frac{x}{a}\right)^{2/3} + \left(\frac{y}{b}\right)^{2/3} = 1$ .



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29.

Prove

that

$$\sqrt{\sec^2 \theta + \csc^2 \theta} = \tan \theta + \cot \theta.$$



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30. The largest possible sphere is carved out of wooden solid cube of side 7 cm. What is the radius of this sphere ?



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**31.** A solid cuboid with dimensions  $18 \text{ cm} \times 12 \text{ cm} \times 8 \text{ cm}$  is melted and turned into a cube. What is the length of its edge ?



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**32.** A line intersects the y-axis and x-axis at the points P and Q respectively. If  $(2, -5)$  is the midpoint of PQ then find the coordinates of P and Q.



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**33.** A ladder 10m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.



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**34.** Solve for x and y :

$$x + \frac{y}{4} = 11, \quad \frac{5x}{6} - \frac{y}{3} = 7$$



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**35.** A 2-digit number is such that the product of the digit is 20. If 9 is subtracted from the number, the digits interchange their places. Find the number.



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**36.**  $\triangle ABC$  with vertices  $A(0,-2,0), B(2,0)$  and  $C(0,2)$  is similar to  $\triangle DEF$  with vertices  $D(-4,0), E(4,0)$  and  $F(0,4)$ .



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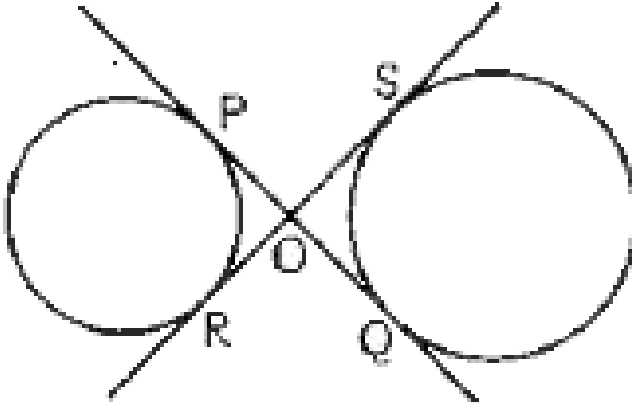
**37.** Prove that the length of the tangents drawn from an external point to a circle are equal.



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**38.** In the figure, PQ and RS are the common tangents to two circles intersecting at O.

Prove that  $PQ=RS$



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**39.** A number  $x$  is selected from the numbers 1,2,3 and then a second number  $y$  is randomly selected from the numbers 1,4,9. What is the

probability that the product  $xy$  of the two numbers will be less than 9?



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**40.** Find the value of :

$$\frac{5 \sin^3 30^\circ + \cos^2 45^\circ - 4 \tan^2 30^\circ}{2 \sin 30^\circ \cdot \cos 30^\circ + \tan 45^\circ} + \cos 0^\circ$$



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**41.** The first and the last terms of an A.P. are 17 and 350 respectively. If the common difference

is 9, then how terms are there in the A.P. ?



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**42. Theorem 6.1 :** If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.



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**43.** BL and CM are medians of a triangle ABC right angled at A. Prove that

$$4(BL^2 + CM^2) = 5BC^2$$



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**44.** Write a prime number greater than 91 but less than 100.



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**45.** Find a zero of the polynomial

$$x^3 - 8$$



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**46.** Write a quadratic polynomial whose sum

of zeros is  $\left(-\frac{1}{4}\right)$  and product of zeros is

$$\left(\frac{1}{4}\right)$$



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**47.** Determine the roots of the equation

$$\sqrt{3}x^2 - 2x - \sqrt{3} = 0$$



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**48.** Find the  $15^{th}$  term of the AP,

$$x - 7, x - 2, x + 3, \dots$$



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**49.** Find The discriminant of the equation

$$(x + 1)^3 = 4 - x + x^3$$



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**50.** Write the next term of the A.P :

$$3, 3 + \sqrt{2}, 3 + 2\sqrt{2}, 3 + 3\sqrt{2} \dots$$



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**51.** Solve for  $x$  and  $y$ :

$$x + 2y = 9$$

$$2x - y = 8$$



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**52.** Obtain the condition for the points  $(a,0)$ ,  $(0, b)$  and  $(1, 1)$  to be collinear.



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**53.** Find the coordinates of a point on  $y$ -axis which is equidistant from the points  $(6, 5)$  and  $(-4, 3)$



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**54.** State the ASA criterion of similarity of triangles.



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**55.** Determine the length of the altitude of an isosceles triangle of sides 6 cm, 6 cm and 4 cm.



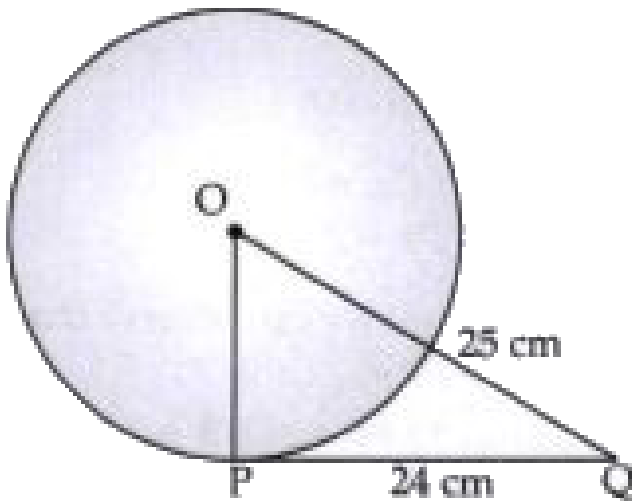
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**56.** Draw a circle and two lines parallel to a given line such that one is a tangent and the other, a secant to the circle.



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57. From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. The radius of the circle is



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58. If  $3\cos A = 1$ , then find the value of  $\operatorname{cosec} A$ .



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59. Show that,  $\frac{1 + \tan^2 \theta}{1 + \cot^2 \theta} = \tan^2 \theta$



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60. Find the perimeter of a quadrant of a circle of radius 'r'.



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**61.** Find the total surface area of a quadrant of a sphere of radius ' $r$ '



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**62.** Find the probability of drawing a green coloured ball from a bag containing 6 red and 5 black balls.



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**63.** Find the median of the first 50 even natural numbers.



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**64.** Satellite TV manufacturing businesses tend to have what economists call "economies of scale." When economies of scale exist, bigness can be its own reward. The more TV's you manufacture in a single run, lower the costs per unit, which in turn increases your bottom-

line margins.

Keeping that in mind, a T.V. manufacturing company increases its production uniformly by fixed number every year. The company produces 8000, sets in the 6<sup>th</sup> year and 11,300 sets in the 9<sup>th</sup> year.

The company's production of the first year is:

A. 2000

B. 2500

C. 3000

D. 5000

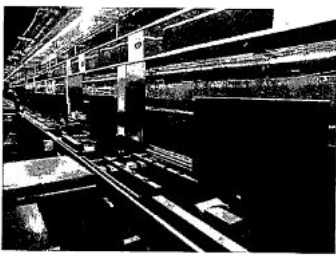


**Answer:**



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**65.** Satellite TV manufacturing businesses tend to have what economists call "economies of scale." When economies of scale exist, bigness can be its own reward. The more TV's you manufacture in a single run, lower the costs per unit, which in turn increases your bottom-line margins.



Keeping that in mind, a T.V. manufacturing company increases its production uniformly by fixed number every year. The company produces 8000, sets in the 6<sup>th</sup> year and 11,300 sets in the 9<sup>th</sup> year.

The company's production of the 8th year is:

A. 9600

B. 9800

C. 10200

D. 10500

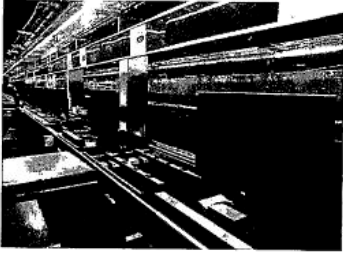
**Answer:**



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**66.** Satellite TV manufacturing businesses tend to have what economists call "economies of scale." When economies of scale exist, bigness can be its own reward. The more TV's you manufacture in a single run, lower the costs per unit, which in turn increases your bottom-

line margins.



Keeping that in mind, a T.V. manufacturing company increases its production uniformly by fixed number every year. The company produces 8000, sets in the 6<sup>th</sup> year and 11,300 sets in the 9<sup>th</sup> year.

The company's total production of the first 6 years is:

A. 28950

B. 30150

C. 30250

D. 31500

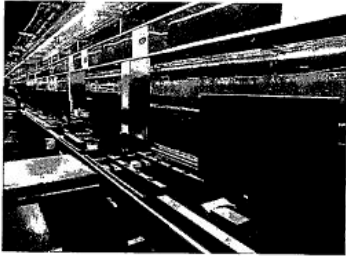
**Answer:**



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**67.** Satellite TV manufacturing businesses tend to have what economists call "economies of scale." When economies of scale exist, bigness can be its own reward. The more TV's you

manufacture in a single run, lower the costs per unit, which in turn increases your bottom-line margins.



Keeping that in mind, a T.V. manufacturing company increases its production uniformly by fixed number every year. The company produces 8000, sets in the 6<sup>th</sup> year and 11,300 sets in the 9<sup>th</sup> year.

The company's production increases every year by:

A. 2500

B. 2200

C. 1800

D. 1100

**Answer:**



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**68.** Satellite TV manufacturing businesses tend to have what economists call "economies of scale." When economies of scale exist, bigness

can be its own reward.

The more TV's you manufacture in a single run, lower the costs per unit, which in turn increases your bottom-line margins.



Keeping that in mind, a T.V. manufacturing company increases its production uniformly by fixed number every year. The company produces 8000 sets in the 6th year and 11,300



sets in the 9th year.

In which year the company's production is 9100 sets ?

A. 5<sup>th</sup>

B. 6<sup>th</sup>

C. 7<sup>th</sup>

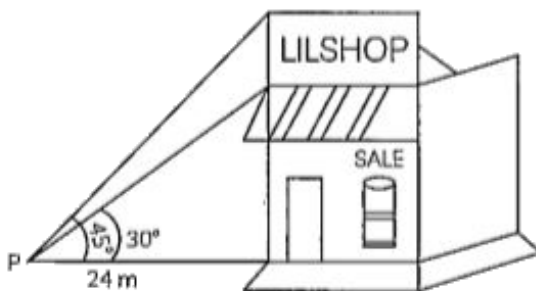
D. 9<sup>th</sup>

**Answer:**



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69. Eshan purchased a new building for her business. Being in the prime location, she decided to make some more money by putting up an advertisement sign for a rental ad income on the roof of the building.



From a point P on the ground level, the angle of elevation of the roof of the building is  $30^\circ$  and the angle of elevation of the top of the sign board is  $45^\circ$ . The point P is at a distance of 24 m from the base of the building.

The height of the building (without the sign board) is

A. 11 m

B. 14 m

C. 17 m

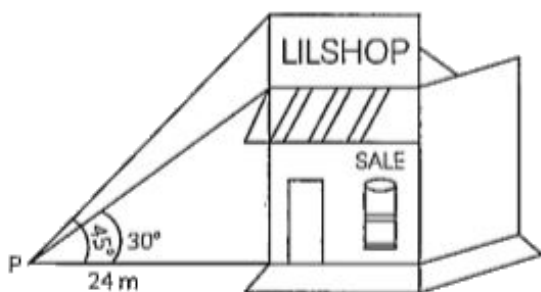
D. 22 m

**Answer:**



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**70.** Eshan purchased a new building for her business. Being in the prime location, she decided to make some more money by putting up an advertisement sign for a rental ad income on the roof of the building.



From a point P on the ground level, the angle of elevation of the roof of the building is  $30^\circ$  and the angle of elevation of the top of the sign board is  $45^\circ$ . The point P is at a distance of 24 m from the base of the building.

The height of the building (with the sign board) is

A.  $24\sqrt{3}m$

B.  $24\sqrt{2}m$

C. 24 m

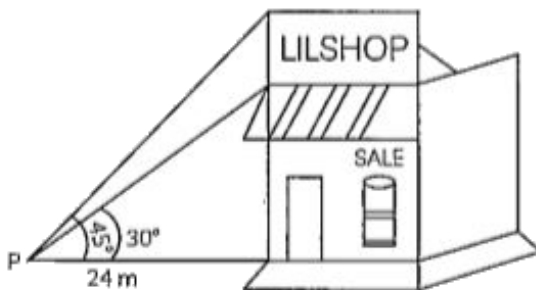
D. 12 m

**Answer:**



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71. Eshan purchased a new building for her business. Being in the prime location, she decided to make some more money by putting up an advertisement sign for a rental ad income on the roof of the building.



From a point P on the ground level, the angle of elevation of the roof of the building is  $30^\circ$  and the angle of elevation of the top of the sign board is  $45^\circ$ . The point P is at a distance of 24 m from the base of the building.

The height of the sign board is

A.  $(24\sqrt{3} - 11)m$

B.  $(24\sqrt{2} - 14)m$

C. 15 m

D. 10 m

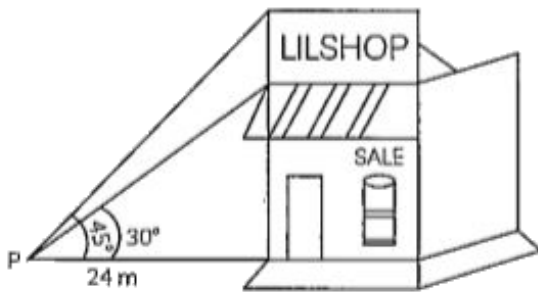


**Answer:**



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**72.** Eshan purchased a new building for her business. Being in the prime location, she decided to make some more money by putting up an advertisement sign for a rental ad income on the roof of the building.



From a point P on the ground level, the angle of elevation of the roof of the building is  $30^\circ$  and the angle of elevation of the top of the sign board is  $45^\circ$ . The point P is at a distance of 24 m from the base of the building.

On the basis of the above information, answer any four of the following questions:

The distance of the point P from the top of the sign board, is

A.  $24\sqrt{3}m$

B.  $24\sqrt{2}m$

C. 24 m

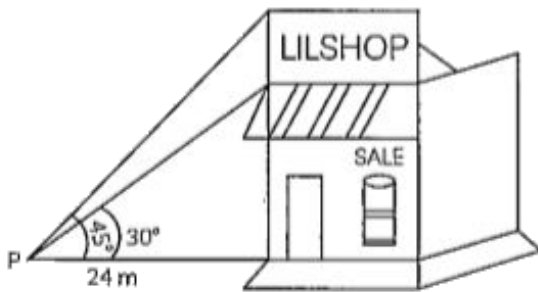
D. 12m

**Answer:**



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**73.** Eshan purchased a new building for her business. Being in the prime location, she decided to make some more money by putting up an advertisement sign for a rental ad income on the roof of the building.



From a point P on the ground level, the angle of elevation of the roof of the building is  $30^\circ$  and the angle of elevation of the top of the sign board is  $45^\circ$ . The point P is at a distance of 24 m from the base of the building.

If the point of observation P is moved 10 m towards the base of the building, then the angle of elevation  $\theta$  of the roof of the building is given by

A.  $\tan \theta = \sqrt{3}$

B.  $\tan \theta = \frac{2}{\sqrt{3}}$

C.  $\tan \theta = \frac{1}{2}$

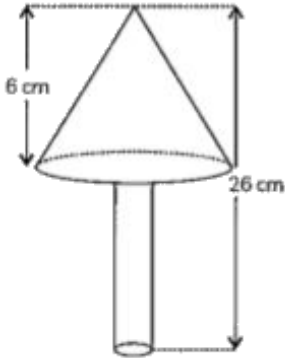
D.  $\tan \theta = 1$

**Answer:**



**74.** In a toys manufacturing company, wooden parts are assembled and painted to prepare a toy. One specific toy is in the shape of a cone mounted on a cylinder.

For the wood processing activity center, the wood is taken out of storage to be sawed, after which it undergoes rough polishing, then is cut, drilled and has holes punched in it. It is then fine polished using sandpaper.



For the retail packaging and delivery activity center, the polished wood sub-parts are assembled together, then decorated using paint.

The total height of the toy is 26 cm and the height of its conical part is 6 cm. The



diameters of the base of the conical part is 5 cm and that of the cylindrical part is 4 cm.

If its cylindrical part is to be painted yellow, the surface area need to be painted is

A.  $80\pi \text{ sqcm}$

B.  $82\pi \text{ sqcm}$

C.  $84\pi \text{ sqcm}$

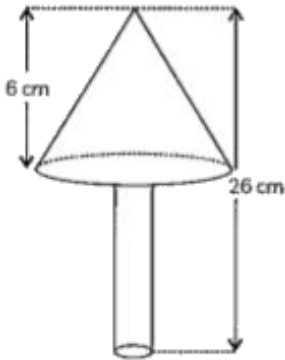
D.  $88\pi \text{ sqcm}$

**Answer:**



**75.** In a toys manufacturing company, wooden parts are assembled and painted to prepare a toy. One specific toy is in the shape of a cone mounted on a cylinder.

For the wood processing activity center, the wood is taken out of storage to be sawed, after which it undergoes rough polishing, then is cut, drilled and has holes punched in it. It is then fine polished using sandpaper.



For the retail packaging and delivery activity center, the polished wood sub-parts are assembled together, then decorated using paint.

The total height of the toy is 26 cm and the height of its conical part is 6 cm. The

diameters of the base of the conical part is 5 cm and that of the cylindrical part is 4 cm.

If its conical part is to be painted green, the surface area need to be painted is

A.  $26.5\pi \text{ sqcm}$

B.  $22.5\pi \text{ sqcm}$

C.  $20.5\pi \text{ sqcm}$

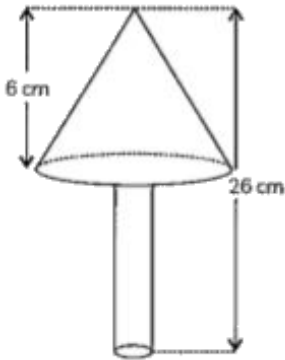
D.  $18.5\pi \text{ sqcm}$

**Answer:**



**76.** In a toys manufacturing company, wooden parts are assembled and painted to prepare a toy. One specific toy is in the shape of a cone mounted on a cylinder.

For the wood processing activity center, the wood is taken out of storage to be sawed, after which it undergoes rough polishing, then is cut, drilled and has holes punched in it. It is then fine polished using sandpaper.



For the retail packaging and delivery activity center, the polished wood sub-parts are assembled together, then decorated using paint.

The total height of the toy is 26 cm and the height of its conical part is 6 cm. The

diameters of the base of the conical part is 5 cm and that of the cylindrical part is 4 cm.

The volume of the wood used in making this toy, is

A.  $92.5\pi \text{ sqcm}$

B.  $89.5\pi \text{ sqcm}$

C.  $85.5\pi \text{ sqcm}$

D.  $72.5\pi \text{ sqcm}$

**Answer:**



77. As part of the 'Swachh Bharat Abhyan', some houses of a locality in Agra decided to clean up and beautify a Primary School of their locality by planting a number of plants. They involved the school kids and the local community in doing so.





Here is the data indicating the number of plants contributed by different houses:

Number of plants contributed	1-3	4-6	7-9	10-12	13-15	16-18
Number of houses	10	8	$x$	7	12	4

If the mean number of plants contributed be 8.9, then how many houses contributed 7 to 9 plants?

- A. 6 houses
- B. 7 houses
- C. 8 houses
- D. 9 houses

**Answer:**



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**78.** As part of the 'Swachh Bharat Abhyan', some houses of a locality in Agra decided to clean up and beautify a Primary School of their locality by planting a number of plants. They involved the school kids and the local community in doing so.



Here is the data indicating the number of plants contributed by different houses:

Number of plants contributed	1-3	4-6	7-9	10-12	13-15	16-18
Number of houses	10	8	$x$	7	12	4

On the basis of the above information, answer any four of the following questions:

The mode of the frequency distribution is

A. 11.5

B. 12.65

C. 13.25

D. 13.65

**Answer:**



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**79.** As part of the 'Swachh Bharat Abhyan', some houses of a locality in Agra decided to clean up and beautify a Primary School of their locality by planting a number of plants. They

involved the school kids and the local community in doing so.



Here is the data indicating the number of plants contributed by different houses:

Number of plants contributed	1-3	4-6	7-9	10-12	13-15	16-18
Number of houses	10	8	$x$	7	12	4

The median class of the frequency distribution is

A. 3.5- 6.5

B. 6.5-9.5

C. 9.5- 12.5

D. 12.5 - 15.5

**Answer:**



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**80.** Write the prime factorisation of 8190.



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**81.** Find the HCF of 2205, 5145 and 4410.



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