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MATHS

BOOKS - EDUCART PUBLICATION

CBSE PAPER (12 MARCH 2020)

Section A

1. Find the HCF of 135 and 225

A. 15

B. 75

C. 45

D. 5

Answer: C

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2. Write the exponent of 2 in the prime factorization of 144.

A. 2

B. 4

C. 1

D. 6

Answer: B

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3. Write the common difference of an A.P. whose nth term is $a_n = 3n + 7$

.

A. 3

B. 7

C. 10

D. 6

Answer: A

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4. Write the value of λ for which $x^2 + 4x + \lambda$ is a perfect square.

A. 16

B. 9

C. 1

D. 4

Answer: D

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5. The value of k, for which the pair of linear equations $kx + y = k^2$ and $x + ky = 1$ has infinitely many solution, is :

A. ± 1

B. -2

C. -1

D. 2

Answer: B

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6. The value of p for which (2p + 1), 10 and (5p + 5) are three consecutive terms of an AP, is :

A. -1

B. -2

C. 1

D. 2

Answer: D

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7. The number of terms of an AP, 5, 9, 13, ...,185 is

A. 31

B. 51

C. 41

D. 40

Answer: B

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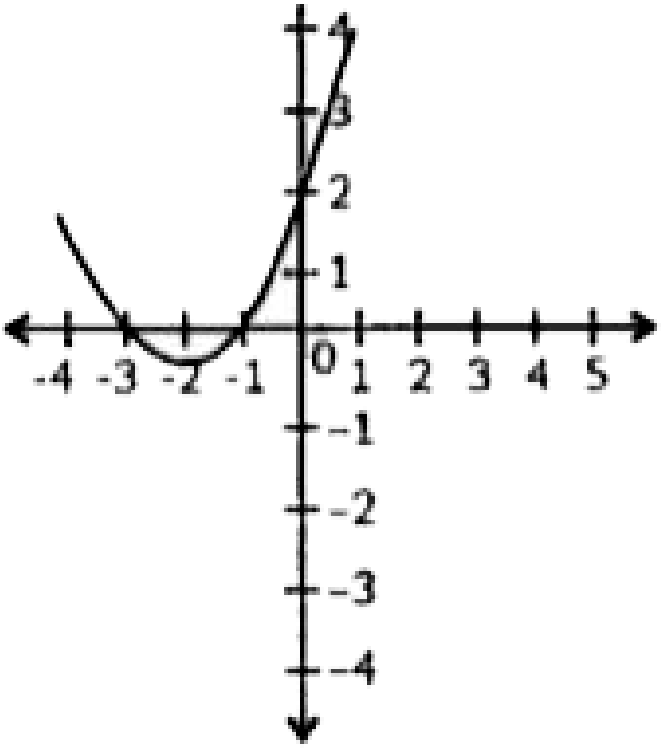
8. In the figure, the graph of the polynomial p(x) is given. The number of zeroes of the polynomial is



A. 1

B. 2

C. 3

D. 0

Answer: B

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9. If (a,b) is the mid - point of the line segment joining the points A (10,-6), B(k,4) and a-2b =18, then find the value of k and the distance AB.

A. 30

B. 22

C. 4

D. 40

Answer:

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10. The value of k for which the points A(0, 1), B(2, k) and C(4, -5) are colinear is :

A. 2

B. -2

C. 0

D. 4

Answer: D

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11. If $\Delta ABC \sim \Delta DEF$ such that AB = 1.2 cm and DE = 1.4 cm, the ratio of the areas of ΔABC and ΔDEF is :

A. $49:36$

B. $6:7$

C. $7:6$

D. $36:49$

Answer: A

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Section A Fill In The Blanks

1. Find the distance between (0, 5) and (-5, 0) is _____

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2. What is the distance between two parallel tangents of a circle of radius 4 cm?

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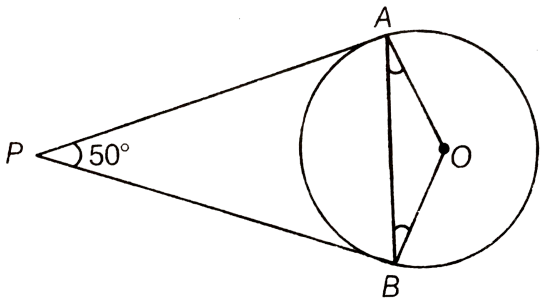
3. In figure, if PA and PB are tangents to the circle with centre O such that $\angle APB = 50^\circ$, then $\angle OAB$ is equal to



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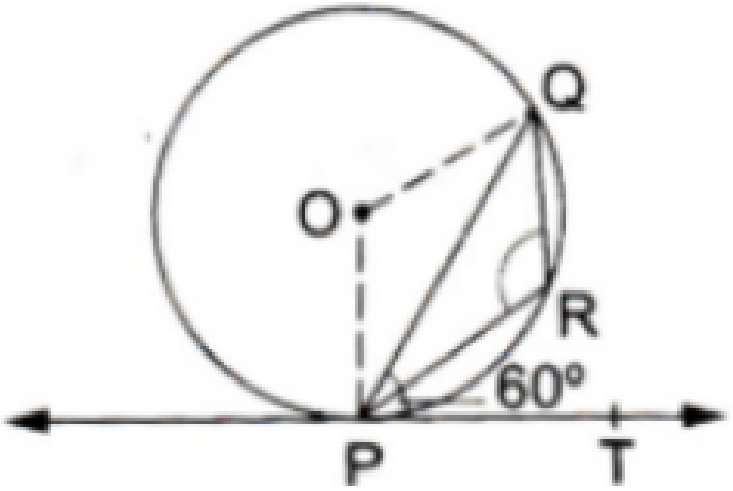
4. In the adjoining figure, PQ is a chord of a circle and PT is the tangent at P such that $\angle QPT = 60^\circ$. Find $\angle PRQ$.



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5. $\frac{3\cot 40^\circ}{\tan 50^\circ} - \frac{1}{2}\left(\frac{\cos 35^\circ}{\sin 55^\circ}\right)$ = _____

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Section A Very Short Answer Type Questions

1. If $\cot\theta = \frac{7}{8}$, then the value of $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$ = _____

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2. The value of $\left(\frac{1}{(1+\tan^2\theta)} + \frac{1}{(1+\cot^2\theta)}\right)$ is

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3. Using the empirical formula, find the mode of a distribution whose mean is 8.32 and the median is 8.05.

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4. The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow?

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5. What is the Arithmetic mean of the first 'n' natural numbers ?

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Section B

1. Find the 11^{th} term from the last term (towards the first term) of the AP 12, 8, 4,...., - 84.

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2. Solve the equation : 1 + 5 + 9 + 13 + ... + x = 1326.

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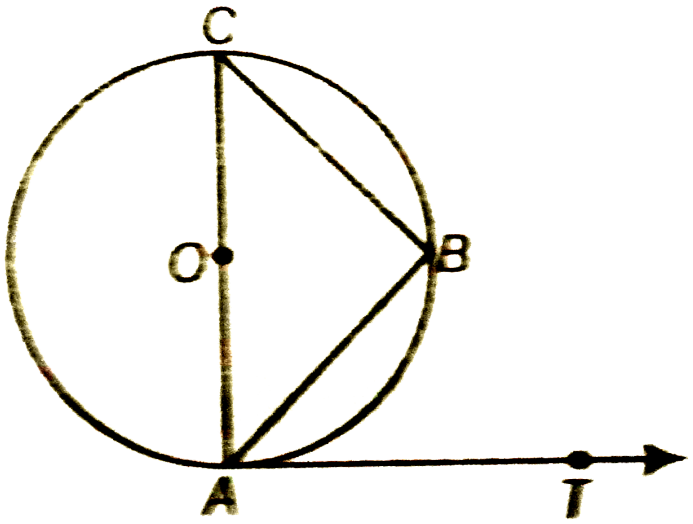
3. If AB is chord of a circle with centre O, AOC is a diameter and AT is the tangent at A as shown in figure. Prove that $\angle BAT = \angle ACB$.



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4. If $\tan\theta = \frac{3}{4}$, find the value of $\left(\frac{1-\cos^2\theta}{1+\cos^2\theta}\right)$

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5. If $\tan\theta = \sqrt{3}$, find the value of $\left(\frac{2\sec\theta}{1+\tan^2\theta}\right)$.

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6. A wooden box (open at the top) of thickness 0.5 cm, length 21 cm, width 11 cm and height 6 cm is painted on the inside. The expenses of painting are Rs. 70. What is the rate of painting per square centimetre?

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7. 

Mathematics teacher of a school took her 10th standard students to show Red fort. It was a part of their Educational trip. The teacher had interest in history as well. She narrated the facts of Red fort to students. Then the teacher said in this monument one can find combination of solid figures. There are 2 pillars which are cylindrical in shape. Also 2 domes at the corners which are hemispherical.7 smaller domes at the centre. Flag hoisting ceremony on Independence Day takes place near these domes.

Find the lateral surface area of two pillars if height of the pillar is 7m and radius of the base is 1.4m.

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8. Find the probability that a leap year selected at random will contain 53 Sundays and 53 Mondays.

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9. Find the value of p, if the mean of the following distribution is 7.5.

Classes	2 – 4	4 – 6	6 – 8	8 – 10	10 – 12	12 – 14
Frequency (f)	6	8	15	p	8	4

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Section C

1. Find a, b and c such that the following numbers are in AP, a, 7, b, 23 and c.

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2. If m times the m^{th} term of an A.P. is equal to n times its n^{th} term, show that the $(m+n)^{th}$ term of the A.P. is zero.

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3. Find the value of k for which the quadratic equation $(k+4)x^2+(k+1)x+1=0$

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4. On dividing $\left(x^3-3x^2+x+2\right)$ by a polynomial g(x), the quotient and remainder are $(x-2)$ and $(-2x+4)$ respectively. Find g(x).

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5. If the sum of the squares of zeroes of the quadratic polynomial $f(x)=x^2-8x+k$ is 40, find the value of k.

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6. In what ratio does the point P(-4, y) divide the line segment joining the point A(-6, 10) and B(3, -8) if it lies on AB. Also, find the value of y.

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7. Theorem: A tangent to a circle is perpendicular to the radius through the point of contact.

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8. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segments joining the points of contact at the centre.

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9. Theorem 6.8 : In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

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10. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \cos ec\theta = q$; show that $q\left(p^2 - 1\right) = 2p$

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11. 500 persons have to dip in a rectangular tank which is 80 m long and 50 m broad. What is the rise in the level of water in the tank, if the average displacement of water by a person is $0.\ 04\ m^3$?

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Section D

1. Show that 12^n cannot end with the digits 0 or 5 for any natural number n

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2. Prove that $\sqrt{2}+\sqrt{5}$ is irrational.

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3. A train covered a certain distance at a uniform speed. If the train would have been 6 m/hr. faster, it would have taken 4 hours less than the scheduled time and if the train would have slowed down by 6 km/hr, it would have taken 6 hours more than scheduled time. Find the length of the journey.

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4. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9AD^2 = 7AB^2$.

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5. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

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6. If the angle of elevation of a cloud from a point 10 metres above a lake is 30° and the angle of depression of its reflection in the lake is 60°. Find the height of the cloud from the surface of lake.

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7. A vertical tower of height 20 m stands on a horizontal plane and is surmounted by a vertical flag staff of height h. At a point on the plane, the angle of elevation of the bottom and top of flag staff are 45° and 60° , respectively. Find the value of h.

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8. A solid iron rectangular block of dimensions 4.4m, 2.6m and 1m is cast into a hollow cylindrical pipe of internal radius 30cm and thickness 5cm. Find the length of the pipe.

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9. For the follwing frequency distribution draw a cumutalive frequency curve of 'more than type' and hence obtain the median value

$$\begin{bmatrix} Class & 0-10 & 10-20 & 20-30 & 30-40 & 40-50 & 50-60 & 60 \\ Frequency & 5 & 15 & 20 & 23 & 17 & 11 & \end{bmatrix}$$

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Set Ii Section A

1. Find the distance between the points $\left(-\frac{8}{5}, 2\right)$ and $\left(\frac{2}{5}, 2\right)$

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2. If tan A = cot B , prove that A + B = 90° .

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3. If $x = a\sin\theta$ and $y = b\cos\theta$, write the value of $\left(b^2x^2 + a^2y^2\right)$.

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Set Ii Section B

1. In a family of 3 children, find the probability of having at least one boy.

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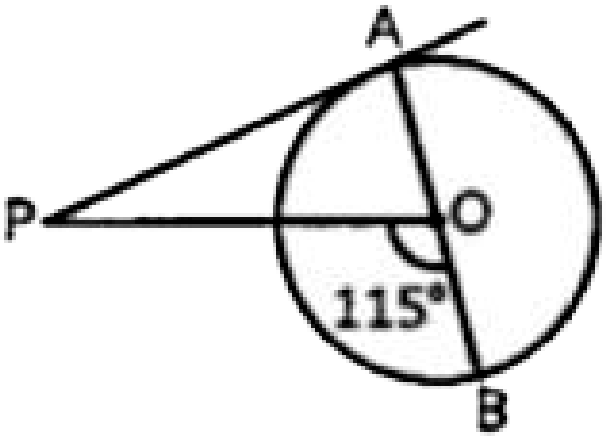
2. In the figure, PA is a tangent from an external point P to a circle with centre O. If $\angle POB = 115^\circ$, find $\angle APO$.



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Set Ii Section C

1. Solve for x : $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq 4, 7$

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2. Show that the points A(-1, 1), B(5, 7) and C(8, 10) are collinear.

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3. If the areas of two similar triangles are equal, prove that they are congruent.

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Set Ii Section D

1. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

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2. From a solid cylinder whose height is 15 cm and diameter 16 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. $[Use \pi = 3.14.]$

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Set Iii Section A

1. The distance of the point (-3, 4) from x -axis is

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2. Value of $\frac{2\tan^2 60^\circ}{1+\tan^2 30^\circ}$ = _____.

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3. Evaluate $(\sec A + \tan A)(1 - \sin A)$ for $A = 60^\circ$.

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Set Iii Section B

1. Prove that the tangents at the extremities of any chord make equal angles with the chord.

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2. Two dice are thrown together once. Find the probability of getting a sum of more than 9.

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Set Iii Section C

1. Find the value of k for which the points A(k+1, 2k), B(3k, 2k +3) and C(5k-1, 5k) are collinear.

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2. Prove that the ratio of the areas of two similar triangles is equal to the ratio of squares of their corresponding medians.

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3. Find the non-zero value of k for which the quadratic equations $kx^2 + 1 - 2(k-1)x + x^2 = 0$ has equal roots. Hence, find the roots of the equation

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Set Iii Section D

1. If we add 1 to the numerator and subtract 1 from the denominator, a fraction becomes 1. It also becomes 1/2 if we only add 1 to the denominator. What is the fraction?

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2. A hemispherical depression is cut out from one face of a cubical block of side $7cm$, such that the diameter of the hemisphere is equal to the edge of the cube. Find the surface area of the remaining solid.

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