



MATHS

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SAMPLE PAPER 03 (MATHEMATICS)

Section A

1. Write the discriminant of the quadratic equation $(x + 5)^2 = 2(5x - 3)$.



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2. Find after how many places of decimal the decimal form of the number $\frac{27}{2^3 \cdot 5^4 \cdot 3^2}$ will terminate.



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3. Express 429 as a product of its prime factors.



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4. Find the sum of first 10 multiples of 6.



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5. Find the value(s) of x , if the distance between the points $A(0, 0)$ and $B(x, -4)$ is 5 units.



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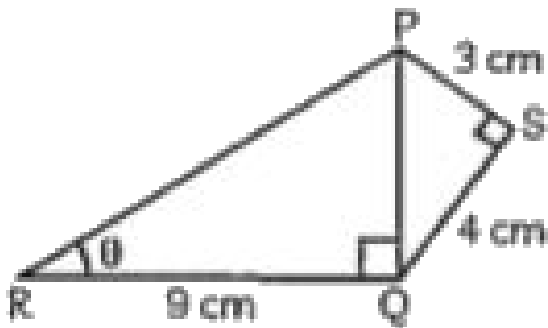
6. Two concentric circles of radii a and b ($a > b$) are given. Find the length of the chord of the larger circle which touches the smaller circle.



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7. In Figure, $PS=3$, $QS = 4$ cm,
 $\angle PRQ = \theta$, $\angle PSQ = 90^\circ$, $PQ \perp RQ$ and

$RQ = 9$ cm. Evaluate $\tan \theta$.



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8. If $\tan \alpha = \frac{5}{12}$, find the value of $\sec \alpha$.



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1. Points $A(3, 1)$, $B(5, 1)$, $C(a, b)$ and $D(4, 3)$ are vertices of a parallelogram $ABCD$. Find the values of a and b .



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2. Points P and Q trisect the line segment joining the points $A(-2, 0)$ and $B(0, 8)$ such that, P is near to A . Find the coordinates of points P and Q .



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3. Solve the following pair of linear equations

$$3x - 5y = 4 \text{ and } 2y + 7 = 9x$$



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4. If HCF of 65 and 117 is expressible in the form $65n - 117$, then find the value of n .



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5. On a morning walk, three persons step out together and their steps measure 30 cm, 36 cm and 40 cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?



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6. A die is thrown once. Find the probability of getting a composite number.



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7. A dice is thrown once. Find the probability of getting a prime number .



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8. Using completing the square method, show that the equation $x^2 - 8x + 18 = 0$ has no solution.



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9. Cards numbered 7 to 40 were put in a box. Poonam selects a card at random. What is the probability that Poonam selects a card which is a multiple of 7?



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Section C

1. The perpendicular from A on side BC of a Δ ABC meets BC at D such that $DB = 3CD$. Prove

that $2AB^2 = 2AC^2 + BC^2$



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2. AD and PM are medians of triangles ABC and PQR respectively where $\Delta ABC \sim \Delta PQR$. Prove

that:
$$\frac{AB}{PQ} = \frac{AD}{PM}.$$



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3. Find remainder when

$p(x) = x^5 - 4x^3 + x^2 + 3x + 1$ is divide by

$$g(x) = x^3 - 3x + 1.$$



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4. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are $(0, -1)$, $(2, 1)$ and $(0, 3)$. Find the ratio of this area to the area of the given triangle.



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5. Find the values of x and y which satisfy the equations:

$$y + 4x = 9 \text{ and } 3y + 2x = 5$$



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



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7. Find the greatest number which on dividing 251 and 628 leaves remainders 1 and 3 respectively.



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



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9. If $\angle A = 90^\circ$, then find the value of

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



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10. If $\tan(A + B) = \sqrt{3}$ and

$$\tan(A - B) = \frac{1}{\sqrt{3}}, 0^\circ < A + B \leq 90^\circ, A > B$$

, then find the value of A and B.



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11. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T . Find the length TP .



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12. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.



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13. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?



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14. The ratio of the number of students of three class is $2:3:5$.If 20 students are added in each class then the ratio becomes $4:5:7$.Find the number of student in each class before adding .



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15. A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm, sweeping through an angle of 120° . Find the total area cleaned at each sweep of the blades.



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Section D

1. A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible t



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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 $(m + n)^{\text{th}}$ term of the A.P. is zero.



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3. The sum of the first three numbers in an Arithmetic Progression is 18. If the product of the first and the third term is 5 times the common difference, find the three numbers.



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4. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60^\circ$. Then construct a

triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.



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5. The decorative block is made of two solids a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block.



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6. A decorative block shown in Fig. 16.50 is made of two solids a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter 4.2 cm. Find the total surface area of the block (Take $\pi = 22/7$).



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7. A bucket is in form of a frustum of a cone with a capacity of 12308.8cm^3 of water. The radii of the top bottom circular ends are 20

cm and 12 cm respectively. Find the height of the bucket and the area of the metal sheet used in its making. [Use $\pi = 3.14$.]



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8. 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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9. Prove that is a right angle triangle, the square of the hypotenuse is equal the sum of the squares of other two sides.



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10. If $1 + \sin^2 \theta = 3 \sin \theta \cos \theta$, then prove that $\tan \theta = 1$ or $\tan \theta = \frac{1}{2}$.



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11. about to only mathematics



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12. The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it is 60° . Find the height of the tower.



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