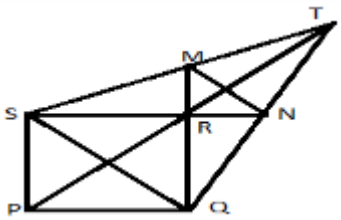
CLASS X
SAMPLE PAPER
MATHS

Section A

1. If r_1 and r_2 be the radii of two solid metallic spheres and if they are melted into one solid sphere, prove that the radius of the new sphere is $(r_1^3 + r_2^3)^{1/3}$.
2. The centre of a circle is $(2\alpha - 1, 7)$ & its passes through the point (-3,-1). If the diameter of the circle is 20 units. Then find the value of α.
3. T is the exterior point on the diagonal PR of a parallelogram PQRS. SR produced meets QT at N & QR produced meets ST at M. Prove that MN || SQ.



4. Find all trigonometric ratios of angle 60^0 geometrically
5. OPQR is a rhombus, three of whose vertices lie on a circle with centre O. If the area of a rhombus is $32\sqrt{3}cm^2$, find the radius of the circle.
6. Find the probability of getting (i) 53 Mondays & 53 Tuesdays in a leap year (ii) 53 saturdays.

Section B

7. Radius of circular track is 63 m. Two cyclists S & J start together from the same position, at the same time & in the same direction with speeds 33 m/min & 44 m/min. After how many minutes they meet again at the starting point.

8. If the height of the tower & the distance of the point of observation from its foot, both are increased by 10%, Prove that both the angles of elevation will remain same.
9. If the point P (x, y) is equidistant from the points Q(a+b, b-a) & R(a-b, a+b) then prove that bx=ay
10. If 2cosβ-sinβ=x & cos β-3sinβ=y Prove that $2x^2+y^2-2xy=5$
11. Three horses are tithered at three corners of a triangular plot having sides 20m, 30m, 40m with ropes of 7m length each. Find the area of the plot which can be grazed by the horses.
12. If mean is 20, find the value of P

X	15	17	19	20+P	23
F	2	3	4	5P	6

Section C

13. Find the HCF if 305 & 793. Also express the HCF in the form 305a+793b for some integers a &b. [-5, 2]
14. If α, β are the zeros of the quadratic polynomial $p(s)=3s^2-6s+4$, find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}+2\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)+3\alpha\beta$.
15. Solve for 'p' & 'q' $2^p+3^q=17 \quad 2^{p+2}-3^{q+1}=5$ {3,2}
16. (i) If x=-4 is a root of the equation $x^2+2x+4p=0$, find the values of k for which the equation $x^2+px(1+3k)+7(3+2k)=0$ has equal roots.
    (ii) Solve for x : $x^2-(2b-1)x+(b^2-b-20)=0$
17. If Sn denotes the sum of first n terms of the AP Prove that $S_{12}=3(S_8-S_4)$
18. If P & Q are two points whose coordinates are $(at^2,2at)$ & $\left(\frac{a}{t^2},-\frac{2a}{t}\right)$, respectively & S is the point (a,0) Show that $\frac{1}{SP}+\frac{1}{SQ}$ is independent of t.

19. A bird is sitting on the top of the tree, which is 80m high. The angle of elevation of the bird from a point on the ground is 45˚ . The bird flies away from the point of observation horizontally and remains at a constant height. After 2 seconds, the angle of elevation of the bird from the point of observation becomes 30˚ ˚ Find the speed of the flying bird.

20. (i)Find the value of x if $4\left(\frac{\sec^2 59^0 - \cot^2 31^0}{3}\right) - \frac{2}{3}\sin 90^0 + 3\tan^2 56^0 \times \tan^2 34^0 = \frac{x}{3}$.

(ii)If $\sqrt{3}\cot^2\theta - 4\cot\theta + \sqrt{3} = 0$ then find the value of $\cot^2\theta + \tan^2\theta$.

21. Prove that : $2Sec^2\theta - Sec^4\theta - 2Coec^2\theta + Co\sec^4\theta = Cot^4\theta - Tan^4\theta$

22. The sum of volumes of 3 cubes is equal to 3 times the volume of cuboid. Given that the edges of 3 cubes is equal to the L, B, H of cuboid. Prove that cuboid is cube itself.

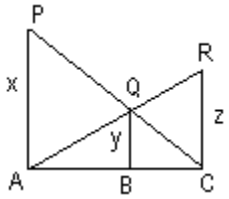
Section D

23. A peacock sitting on the top of a pillar which is 9m high. From a point 27m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal at what distance from the pole the snake is caught.

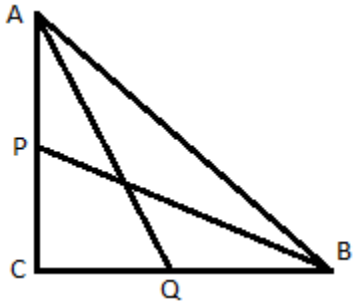
24. If the first term of A.P. is 2 & the sum of first 5 terms is equal to one-fourth of the sum of the next five terms. Find the S_{30}

25. A, b & c are the sides of right triangle, where c is the hypotenuse. A circle of radius r, touches the sides of triangle. Prove that $r = \frac{a+b-c}{2}$

26. PA, QB & RC are each $\perp$ to AC. Prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$.



27. P &Q respectively are mid-points of the sides CA & CB of a right triangle ABC, right angled at C. Prove that (i) $4AQ^2 = 4AC^2 + BC^2$ (ii) $4BP^2 = 4BC^2 + AC^2$ (iii) $4\left(AQ^2 + BP^2\right) = 5AB^2$.



28. (i) A hollow cone is cut by the plane parallel to the base & upper portion is removed If the CSA of remainder is 8/9 of the CSA of the whole cone Find the ratio of line segments into which cone's altitude is divided by the plane. (ii)A right triangle with angles 60^0 & 30^0 is revolved about the hypotenuse of length 84cm long. Find the volume of double cone so formed.

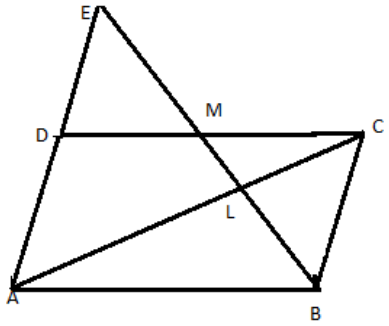
29. Find median wages of workers

Wages(`)	>th&=150	>140	130	120	110	100	90	80
No of worke	0	10	29	60	104	134	151	160

30. (A) A die is thrown once. Find the probability of getting : (i) a number less than 3. (ii) a number greater than 4. (iii) a number which is divisible by 2 & 3 both. [Ans : (i) 1/3 (ii) 1/3 (iii) 1/6]

(B) A child's game has 8 Δ's of which 3 are blue & rest are red, & 10 squares of which 6 are blue & rest are red. One piece is lost at random. Find the probability that it is a (i) triangle. (ii) square (iii) square of blue color (iv) triangle of red color.

31. M is the mid-point of side CD of ||gm ABCD. BM when joined meets AC in L & AD produced in E. Prove that EL = 2 BL.



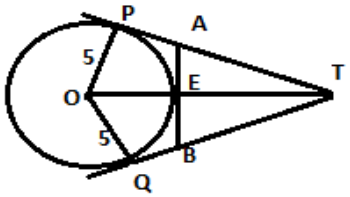
For querries regarding this paper please send on whatsapp number 90415-11611

Vishvas tutorials Ludhiana.

Vishvas_1@ymail.com

Extra questions just for practice

1. A thief runs away from a police station at a speed of 100m/min. After 1 min a police man runs behind the thief to catch him. He goes at a speed of 100m/min in the 1^{st} min. & increases the speed by 10m in each succeeding min. After how many min. will the police catch the thief. {5 min}
2. A bucket is open at the top is in the form of frustum of cone having capacity $12308.8cm^3$. The radii of top & bottom ends are 20 cm & 12 cm. Find the area of metal sheet required.(π=3.14)
3. O is the centre of the circle of radius 5 cm. T is a point such that OT=13cm, OT intersects circle at E. If AB is tangent at E. Find AB.



4. If a circle touches side QR of ∆ PQR at C & extended sides PQ & PR at B & A respectively Prove that PB= ½(PQ+QR+PR).
5. After travelling a distance of 30 km/hr with a uniform speed there is some defect in a train engine & speed reduced to 4/5 of the original speed. Consequently, the train reaches its destination late by 45 min. Had it happened after covering 18km more, the train would have reached 9 min. earlier. Find the speed of train & distance. {30,20}