



UNIVERSAL EDUCATION CENTRE

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Class X,

Sub:- Mathematics, (Important Questions for SA 2 Examination)

Section – A

1. If the circumference of a circle is equal to the perimeter of a square then the ratio of their area is :
(a) 22 : 7 (b) 14 : 11 (c) 7 : 22 (d) 7 : 11
Ans. **(b) 14 : 11**
2. Minute hand of a clock is 21 cm. Distance moved by the tip of minute hand in 1 hr is :
(a) 21π cm (b) 42π cm (c) 10.5π cm (d) 7π cm
Ans. **(b) 42π cm**
3. $C(O, r_1)$ and $C(O, r_2)$ are two concentric circles with $r_1 > r_2$. AB is a chord of $C(O, r_1)$ touching $C(O, r_2)$ at C then :
(a) $AB = r_1$ (b) $AB = r_2$ (c) $AC = BC$ (d) $AB = r_1 + r_2$
Ans. **(c) $AC = BC$**
4. To divide a line segment AB in the ratio 4 : 7, a ray AX is drawn first such that $\angle BAX$ is an acute angle and then points A_1, A_2, A_3, \dots are located at equal distances on the ray AX and the point B is joined to :
(a) A_{12} (b) A_{11} (c) A_{10} (d) A_9
Ans. **(b) A_{11}**
5. The sum of first 11 terms of an AP whose middle term is 30, is:
(a) 320 (b) 330 (c) 340 (d) none of these
Ans. **(b) 330**
6. Two circles are intersecting externally at a point, the number of common tangent drawn are :
(a) 2 (b) 3 (c) 4 (d) no common tangents
Ans. **(b) 3**
7. To construct a triangle similar to a given $\triangle ABC$ with its sides $\frac{8}{5}$ of the corresponding sides of $\triangle ABC$, draw a ray BX such that $\angle CBX$ is an acute angle and X is on the opposite side of A with respect to BC. The minimum number of points to be located at equal distances on ray BX is :
(a) 5 (b) 8 (c) 13 (d) 3
Ans. **(b) 8**
8. Two parallel lines touch the circle at points A and B respectively. If area of the circle is 25cm^2 , then AB is equal to
(a) 5 cm (b) 8 cm (c) 10 cm (d) 25 cm
Ans. **(c) 10 cm**
9. The number of points on x – axis which are at a distance of 2 units from (2, 4) is :
(a) 1 (b) 2 (c) 0 (d) 3
Ans. **(c) 0**
10. A right angled triangle of sides AB = 6 cm and BC = 8 cm is drawn. A circle taking side BC as a diameter is drawn. The length of tangent from point A to the circle is :
(a) 8 cm (b) 6 cm (c) 10 cm (d) none of these
Ans. **(b) 6 cm**
11. An equation equivalent to the quadratic equation $x^2 - 6x + 5 = 0$ is :
(a) $6x^2 - 5x + 1 = 0$ (b) $x^2 - 5x + 6 = 0$ (c) $5x^2 - 6x + 1 = 0$ (d) none of these
Ans. **(d) none of these**
12. If two towers of height h_1 and h_2 subtend angles of 60° and 30° respectively at the mid – point of the line joining their feet, then $h_1 : h_2 =$
(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 3 : 1
Ans. **(d) 3 : 1**
13. The vertices of a triangle are (0, 0), (3, 0) and (0, 4). Its orthocenter is at :

- Ans. (a) (0, 3) (b) (4, 0) (c) (0, 0) (d) (3, 4)
(c) (0, 0)

14. If the angles of elevation of the top of a tower from two distinct point at a point at a distance of x and y ($x > y$) from its foot are 30° and 60° respectively, then the height of the tower is :

- (a) $\sqrt{x+y}$ (b) \sqrt{xy} (c) $\sqrt{x-y}$ (d) $\sqrt{\frac{x}{y}}$

Ans. **(b) \sqrt{xy}**

15. A cylindrical vessel open at the top contains water up to $\frac{1}{3}$ of its height. A heavy sphere whose diameter is equal to the height of the vessel is placed in the vessel touching its surface. Then the correct statement is :

- (a) Water stands at half the height of the vessel (b) Water stands up to top of the vessel
 (c) Water stands $\frac{3}{4}$ of the height of the vessel (d) Water overflows out of the vessel.

Ans. **(b) Water stands up to top of the vessel**

16. If $a + b + c = 0$, $a \neq 0$, $a, b, c \in \mathbb{R}$, then roots of the equation $ax^2 + bx + c = 0$ are

- (a) a, b (b) $1, c$ (c) $1, \frac{c}{a}$ (d) $1, \frac{b}{a}$

Ans. **(c) $1, \frac{c}{a}$**

17. The probability of getting a number between 1 and 100 which is divisible by 1 and itself only is :

- (a) $\frac{29}{98}$ (b) $\frac{1}{2}$ (c) $\frac{25}{98}$ (d) $\frac{23}{98}$

Ans. **(c) $\frac{25}{98}$**

18. A fair dice is rolled. Probability of getting a number x such that $1 \leq x \leq 6$, is :

- (a) 0 (b) > 1 (c) between 0 and 1 (d) 1

Ans. **(d) 1**

19. A rectangular block of diameter 6 cm x 12 cm x 15 cm is cut into exact number of equal cubes. The least possible number of cubes will be

- (a) 6 (b) 11 (c) 33 (d) 40

Ans. **(d) 40**

20. A sphere and a cube have equal surface areas. The ratio of the volume of the sphere to that of cube is :

- (a) $\sqrt{\pi} : \sqrt{6}$ (b) $\sqrt{6} : \sqrt{\pi}$ (c) $\sqrt{\pi} : \sqrt{3}$ (d) $\sqrt{3} : \sqrt{\pi}$

Ans. **(b) $\sqrt{6} : \sqrt{\pi}$**

21. The 10th term of the sequence $\sqrt{3}, \sqrt{12}, \sqrt{27} \dots$ is :

- (a) $\sqrt{243}$ (b) $\sqrt{300}$ (c) $\sqrt{363}$ (d) $\sqrt{432}$

Ans. **(b) $\sqrt{300}$**

Section – B

1. If S_n denotes the sum of n terms of an AP whose common difference is d and 1st term is a .

Find $S_n - 2S_{n-1} + S_{n-2}$.

Ans. **d**

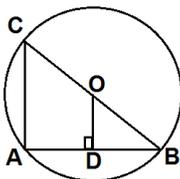
2. A sector of circle of radius 12 cm has the angle 120° . It is rolled up so that the two bounding radii are formed together to form a cone. Find the volume of the cone.

Ans. **189.58 cm^3**

3. For the lunch, the food is kept in 3 cylindrical containers of diameter 1.4 m and height 56 cm. How many students can be served if the food is served twice with a hemispherical bowl of radius 14 cm?

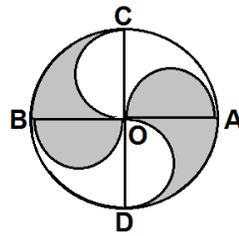
Ans. **225**

4. In the given fig. OD is perpendicular to the chord AB of a circle whose centre is O. If BC is a diameter, find $\frac{CA}{OD}$.



Ans. **2**

5. Find the length of boundary and area of shaded portion only, if $OA = OB = OC = OD = 14$ cm.



Ans. **132 cm and 308 cm²**

6. Water flows out through a cylindrical pipe of internal diameter 7 cm at the rate of 36 km/h. Calculate the time in second, it would take to fill a cylindrical tank, the radius of whose base is 35 cm and height 1 m.

Ans. **10 sec**

7. A motor boat whose speed is 18 km/h in still water takes 1 hr more to go 24 km upstream than to return downstream to the same spot. Find the speed of stream.

Ans. **6 km/h**

8. If m times the m^{th} term of an AP is equal to n times its n^{th} term, find its $(m + n)^{\text{th}}$ term.

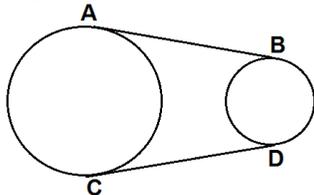
Ans. **0**

Section – C

1. A natural number, when increased by 12, becomes equal to 160 times its reciprocal. Find the number.

Ans. **8**

2. In the given fig. AB and CD are common tangents to two circles of unequal radii. Prove that AB = CD.



3. Construct $\triangle ABC$ in which $AB = 4$ cm, $\angle B = 120^\circ$ and $BC = 5$ cm. Construct another $\triangle A'B'C'$ similar to $\triangle ABC$ such that $AB' = \frac{5}{4} AB$.

4. A bag contains 25 cards numbered from 1 to 25. One card is drawn at random from the bag. Find the probability that this card has a number which is divisible by both 2 and 3.

Ans. **$\frac{4}{25}$**

5. The coefficient of x in the quadratic equation $x^2 + bx + c = 0$ was taken as 17 in place of 13, its roots were found to be -2 and -15 . Find the roots of the original equation.

Ans. **Original equation: $x^2 + 13x + 30 = 0$, and roots are $-10, -3$**

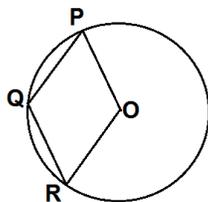
6. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter of the sphere.

Ans. **6 cm**

7. The sum of the radius of the base and the height of a solid cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 cm^2 , find the volume of the cylinder. (Use $\pi = \frac{22}{7}$)

Ans. **4620 cm^3**

8. In the given figure, OPQR is a rhombus, three of whose vertices lie on a circle with centre O. If the area of the rhombus is $32\sqrt{3} \text{ cm}^2$, find the radius of the circle.



Ans. **8 cm**

9. A cube and a cuboid have the same volume. The dimensions of the cuboid are in the ratio $1 : 2 : 4$. If the differences between the cost of polishing the cuboid and the cube at the rate of Rs. $5/\text{m}^2$ is Rs. 80, find their volumes.

Ans. **64 m^3**

10. The angle of elevation of a cloud from a point 200 m above a lake is 30° and the angle of depression of its reflection in the lake is 60° . Find the height of the cloud above the lake.

Ans. **400 m**

11. Find the point of intersection of y – axis and the perpendicular bisector of (2, - 3) and (- 4, 1).

Ans. $(0, \frac{1}{2})$

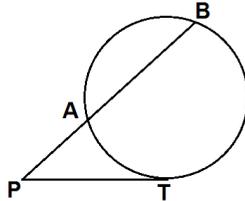
12. In a single throw of two dice, find the probability that neither a doublet nor a total of 9 will appear.

Ans. $\frac{13}{18}$

13. Construct an isosceles triangle ABC in which base BC = 6 cm and altitude from A to BC is 4 cm. Construct another triangle whose sides are $\frac{3}{4}$ th of the corresponding sides of ΔABC .

14. ABC, an isosceles triangle in which AB = AC, is circumscribed about a circle, show that BC is bisected at the point of contact.

15. In the given figure, PT is tangent to the circle at T. If PA = 4 cm and AB = 5 cm, find PT



Ans. **6 cm**

16. AB is diameter and AC is a chord of a circle such that $\angle BAC = 30^\circ$. If the tangent at C intersects AB produced in D, prove that BC = BD.

17. If the sum of first m terms of an AP is n and the sum of first n terms is m, then show that the sum of first (m + n) terms is $-(m + n)$.

Section – D

1. A trader bought a number of articles for Rs. 900, five articles were found damaged. He sold each of the remaining article Rs. 2 more than he paid for it. He got a profit of Rs. 80 on the whole transaction. Find the number of articles he bought.

Ans. **75**

2. A selection committee interviewed some people for two post of sales manager. The committee wanted that the female candidates should be given better chance. So they called male and female candidates in such a manner that probability of selection of female candidate is $\frac{5}{8}$.

(a) if 6 male candidates were interviewed, how many female candidates were interviewed?

(b) which value is shown by the selection committee.

Ans. **(a) 10 (b) Gender equality**

3. A solid cylinder of diameter 12 cm and height 15 cm is melted and recast into 12 toys in the shape of a right circular cone mounted on a hemisphere. Find the radius of the hemisphere and total height of the toy if height of the cone is 3 times the radius.

Ans. **Radius = 3 cm and total height = 12 cm**

4. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is its original speed?

Ans. **42 km/h**

5. A peacock is sitting on the top of a pillar which is 9 m high. From a point 27 m 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 hole is the snake caught ?

Ans. **12 m**

6. Solve for x : $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-3)(x-2)} + \frac{1}{(x-3)(x-4)} = \frac{1}{6}$

Ans. **X = 7, - 2**

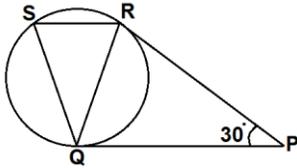
7. A man is standing on the deck of a ship which is 10 m above the water level. He observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30° . Find the distance of the hill from the ship and the height of the hill.

Ans. **H = 40 m and distance = $10\sqrt{3}$ m**

8. Rahul asks the labour to dig a well upto a depth of 10 meters. Labour charges Rs. 200 for first metre and increases Rs. 50 for each subsequent metres.
 (a) How much labour is to be period for digging 10th metre.
 (b) As labour was uneducated he claims Rs. 4000 for the whole work. Rahul pays Rs. 4250 to the labour. What value of Rahul is depicted.

Ans. **(a) Rs. 650 (b) Honesty**

9. In the given figure, tangent PQ and PR are drawn to a circle such that $\angle RPQ = 30^\circ$. A chord RS is drawn parallel to the tangent PQ. Find the $\angle RQS$.



Ans. **30°**

10. The equation $5x^2 + (9 + 4p)x + 2p^2 = 0$ and $5x + 9 = 0$ are satisfied by the same value of x. Find the value of p.

Ans. **$\frac{18}{5}$**

11. $a_1, a_2, a_3, \dots, a_{24}$ are in AP and $a_1 + a_5 + a_{10} + a_{20} + a_{24} = 300$. Find the sum of first 24 terms of the AP.

Ans. **1200**

12. A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is $\frac{8}{9}$ th of the curved surface of the whole cone, find the ratio of the line segment into which the cone's altitude is divided by the plane.

Ans. **1 : 2**

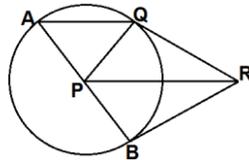
13. A boy is standing on the ground and flying a kite with a string of 150 m, at an angle of elevation of 30° . Another boy is standing on the roof of a 25 m high building and is flying his kite at an elevation of 45° . Both the boys are on opposite sides of both the kites. Find the length of the string (in metres), that the second boy must have so that the two kites meet.

Ans. **$50\sqrt{2}$ m**

14. 500 persons are taking a dip into a cuboidal pond which is 80 m long and 50 m broad. What is the rise of water level in the pond, if the average displacement of the water by a person is 0.04 m^3 ?

Ans. **0.5 cm**

15. QR is a tangent at Q. $PR \parallel AQ$, where AQ is a chord through A and P is the centre of the circle with the end point of the diameter AB. Prove that BR is tangent at B.



16. If a student had walked 1 km/h faster, he would have taken 15 minutes less to walk 3 km. Find the rate at which he was walking.

Ans. **3 km/h**

17. Fire in a building P is reported to two fire stations A and B, 40 km apart from each other on a straight road. A observed that the fire is at an angle of 60° to the road and B observes that it is at an angle of 45° to the road.

- (a) Which station should send its team and how much will this team have to travel?
 (b) What according to you, are the values displayed by the teams at fire stations A and B?

Ans. **(a) Station A (b) Ability to take prompt decision.**

18. Two circles with centres O and O' of radii 3 cm and 4 cm, respectively intersect at two points P and Q such that $OP = O'P$ are tangents to the circles. Find the length of the common chord PQ.

Ans. **4.8 cm**

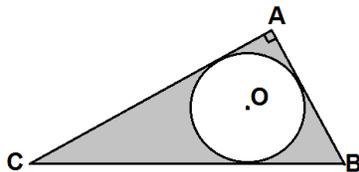
19. Rahul is 29 m away from the centre of a circular flower bed. Find the distance he has to cover to reach the flower bed along the tangential path if the radius of the flower bed is 20 m.

Ans. **21 m**

20. At the foot of a mountain, the angle of elevation of its summit is 45° . After ascending 1 km towards the mountain up an inclination of 30° , the angle changes to 60° . Find the height of the mountain.

Ans. **1.366 km**

21. In a group of children, each child gives gifts to others. If the number of gifts is 132, find the number of children.
Ans. **12**
22. The sum of n terms of an AP whose first term is 5 and common difference is 36 is equal to the sum of $2n$ terms of another AP whose first term is 36 and common difference is 5. Find n .
Ans. **10**
23. Two water taps together can fill the tank in $9\frac{3}{8}$ hrs. The tap of larger diameter takes 10 hrs less than the smaller one to fill the tank. Find the time in which each tap can separately fill the tank.
Ans. **25 Hours and 15 Hours**
24. The difference of two numbers is 4. If the difference of their reciprocals is $\frac{4}{11}$. Find the numbers.
Ans. **(7, 3) Or (-3, -7)**
25. Student of a class 'X' collected Rs. 9000. They wanted to divide it equally among a certain number of students residing in slums area. When they started distributing the amount, 20 more students from near by slums also joined. Now each student got Rs. 160 less.
(a) Find the original number of students living in the slum.
(b) Which value is depicted by students of class X?
Ans. **(a) 25 (b) care for others**
26. If P and Q are two points whose coordinates are $(at^2, 2at)$ and $(\frac{a}{t^2}, -\frac{2a}{t})$ respectively and S is the point $(a, 0)$. Show that $\frac{1}{SP} + \frac{1}{SQ}$ is independent of t .
27. ABC is a right triangle, right angled at A. Find the area of shaded region if AB = 6 cm, BC = 10 cm and O is the centre of the incircle of ΔABC . (Take $\pi = 3.14$)



- Ans. **11.44 cm²**
28. If a number x is chosen from the number 1, 2, 3 and a number y is selected from the numbers 1, 4, 9, find the probability that $xy = 10$.
Ans. **0**
29. A right triangle whose sides are 3 cm and 4 cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed. (Choose value of π as found appropriate)
Ans. **30.14 cm³ and 52.8 cm²**
30. The diameters of the front and rear wheels of a tractor are 80 cm and 2 m respectively. Find the number of revolutions that rear wheel will make to cover the distance which the front wheel covers in 1400 revolutions.
Ans. **560**
31. A boy standing on a horizontal plane, finds a bird flying at a distance of 100 m from him at an elevation of 30° . A girl standing on the roof of 20 m high building, finds the angle of elevation of the same bird to be 45° . Both the boy and the girl are on opposite sides of the bird. Find the distance of the bird from the girl.
Ans. **30 $\sqrt{2}$ m**
32. A pipe can fill a tank in $(x - 2)$ hours and the other pipe can empty the full tank in $(x + 2)$ hours. If the tank is empty and both the pipes are opened together, the tank is filled completely in 24 hours. Find, how much time will the second pipe take to empty the tank.
Ans. **12 Hours**
33. A student left 10 minutes later than the scheduled time and in order to reach his school 4 km away from his house in time, he has to increase his speed by 2 km/h from his usual speed.
(a) Find his usual speed.
(b) Which mathematical concept is used in the above question ?
(c) By increasing his speed which value is depicted by the students.
Ans. **(a) 6 km/h (b) Quadratic Equation (c) Punctuality obedience**

ALL THE BEST