QS

area related to circle

intro trigonometry

triangle

quadratic eq

1

36. Maximum Profit : An automobile manufacturer can produce up to 300 cars per day. The profit made from the sale of these vehicles can be modelled by the function $P(x) = -x^2 + 350x - 6600$ where $P(x)$ is the profit in thousand Rupees and x is the number of automobiles made and sold. Answer the following questions based on this model:

(i) When no cars are produce what is a profit/loss?

(ii) What is the break even point ? (Zero profit point is called break even) ?

(iii) What is the profit/loss if 175 cars are produced ?

OR

What is the profit if 400 cars are produced ?

32. For what value of k, which the following pair of linear equations have infinitely many solutions:
$2x + 3y = 7$ and $(k+1)x + (2k-1)y = 4k+1$

OR

The cost of 2 kg of apples and 1kg of grapes on a day was found to be Rs. 160. After a month, the cost of 4kg of apples and 2kg of grapes is Rs. 300. Represent the situations algebraically and geometrically.

5. Each root of $x^2 - bx + c = 0$ is decreased by 2. The resulting equation is $x^2 - 2x + 1 = 0$, then

(a) $b = 6, c = 9$ (b) $b = 3, c = 5$

(c) $b = 2, c = -1$ (d) $b = -4, c = 3$

6. $(x^2 + 1)^2 - x^2 = 0$ has

(a) four real roots

(b) two real roots

(c) no real roots

(d) one real root

1. If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to their product, then k equals

(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$

(c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

2. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

(a) 10 (b) -10

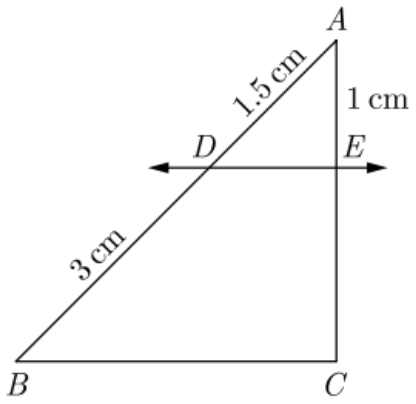
(c) -7 (d) -2

3. The 2 digit number which becomes $\frac{5}{6}$th of itself when its digits are reversed. The difference in the digits of the number being 1, then the two digits number is

(a) 45 (b) 54

(c) 36 (d) None of these

9. In the given figure, $DE \parallel BC$. The value of EC is



(a) 1.5 cm (b) 3 cm

(c) 2 cm (d) 1 cm

21. In $\Delta ABC, AD \perp BC$, such that $AD^2 = BD \times CD$. Prove that ΔABC is right angled at A.

27. Prove that : $\dfrac{\cot\theta + \operatorname{cosec}\theta - 1}{\cot\theta - \operatorname{cosec}\theta + 1} = \dfrac{1+\cot\theta}{\sin\theta}$

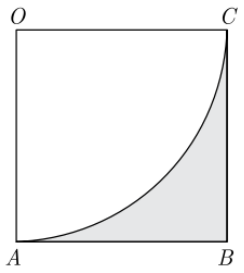
23. If $\tan 2A = \cot(A - 18^\circ)$, where $2A$ is an acute angle, find the value of A.

11. The value of the expression
$\operatorname{cosec}(75^\circ + \theta) - \sec(15^\circ - \theta) - \tan(55^\circ + \theta) + \cot(35^\circ - \theta)$ is

(a) -1 (b) 0

(c) 1 (d) $\dfrac{3}{2}$

13. In the adjoining figure, $OABC$ is a square of side 7 cm. OAC is a quadrant of a circle with O as centre. The area of the shaded region is



(a) $10.5\ \text{cm}^2$ (b) $38.5\ \text{cm}^2$

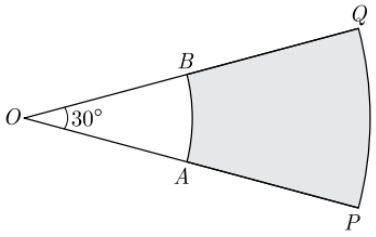
(c) $49\ \text{cm}^2$ (d) $11.5\ \text{cm}^2$

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

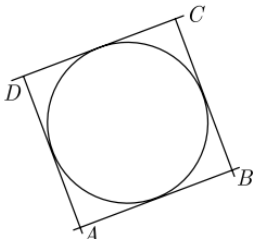
28. A road which is 7 m wide surrounds a circular park whose circumference is 88 m. Find the area of the road.

OR

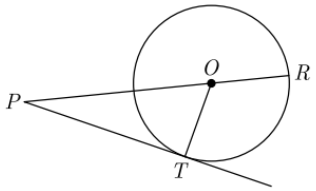
In Figure, PQ and AB are two arcs of concentric circles of radii 7 cm and 3.5 cm respectively, with centre O. If $\angle POQ = 30^\circ$, then find the area of shaded region.



22. In figure, a circle touches all the four sides of a quadrilateral $ABCD$. If $AB = 6$ cm, $BC = 9$ cm and $CD = 8$ cm, then find the length of AD.



10. In figure, on a circle of radius 7 cm, tangent PT is drawn from a point P such that $PT = 24$ cm. If O is the centre of the circle, then the length of PR is



(a) 30 cm (b) 28 cm
(c) 32 cm (d) 25 cm

2

1. If α and β are the zeroes of the polynomial x^2+2x+1, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to

(a) -2 (b) 2

(c) 0 (d) 1

2. The quadratic polynomial, the sum of whose zeroes is -5 and their product is 6, is

(a) x^2+5x+6 (b) x^2-5x+6

(c) x^2-5x-6 (d) $-x^2+5x+6$

3. In a number of two digits, unit's digit is twice the tens digit. If 36 be added to the number, the digits are reversed. The number is

(a) 36 (b) 63

(c) 48 (d) 84

4. x and y are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of $x+y$ is

(a) 10 (b) 11

(c) 12 (d) 13

5. If ½ is a root of the equation $x^2+kx-\frac{5}{4}=0$, then the value of k is

(a) 2 (b) -2

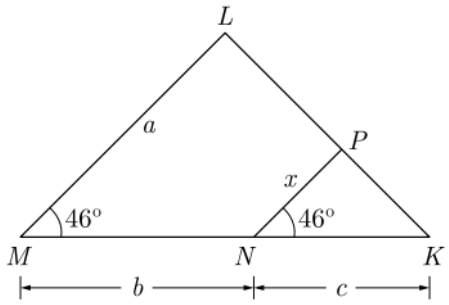
(c) $\frac{1}{4}$ (d) $\frac{1}{2}$

6. The real roots of the equation $x^{2/3}+x^{1/3}-2=0$ are

(a) $1, 8$ (b) $-1,-8$

(c) $-1, 8$ (d) $1,-8$

9. In the given figure, x is



(a) $\frac{ab}{a+b}$ (b) $\frac{ac}{b+c}$

(c) $\frac{bc}{b+c}$ (d) $\frac{ac}{a+c}$

21. In an equilateral triangle of side 24 cm, find the length of the altitude.

31. Given that $\sqrt{2}$ is irrational, prove that $(5+3\sqrt{2})$ is an irrational number.

32. Find c if the system of equations $cx+3y+(3-c)=0; 12x+cy-c=0$ has infinitely many solutions?

OR

Solve for x and y :

$2x-y+3=0,$ $\qquad\qquad$ $3x-5y+1=0$

36. Model Rocketry : A model rocket is a small rocket designed to reach low altitudes and be recovered by a variety of means. Flying model rockets is a relatively safe and inexpensive way for person to learn the basics of forces and the response of a vehicle to external forces. Like an airplane, a model rocket is subjected to the forces of weight, thrust, and aerodynamics during its flight.

Shalvi is a member of first rocket club of India named STAR Club. She launches her latest rocket from a large field. At the moment its fuel is exhausted, the rocket has a velocity of 240 ft/sec and an altitude of 544 ft. After t sec, its height $h(t)$ above the ground is given by the function $h(t) = -16t^2+240t+544$.

(i) How high is the rocket 5 sec after the fuel is exhausted?
(ii) How high is the rocket 10 sec after the fuel is exhausted?
(iii) What is the maximum height attained by the rocket?

OR

How many seconds was the rocket airborne after its fuel was exhausted?

34. The angle of elevation of an aeroplane from a point on the ground is 60°. After a flight of 30 seconds the angle of elevation becomes 30°. If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane.

OR

Amit, standing on a horizontal plane, find a bird flying at a distance of 200 m from him at an elevation of 30°. Deepak standing on the roof of a 50 m high building, find the angle of elevation of the same bird to be 45°. Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak.

27. If $\sin\theta + \cos\theta = \sqrt{2}$ prove that $\tan\theta + \cot\theta = 2$

23. Evaluate :

$$\frac{3\tan^2 30^\circ + \tan^2 60^\circ + \operatorname{cosec} 30^\circ - \tan 45^\circ}{\cot^2 45^\circ}$$

11. If $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to

(a) $\frac{b}{\sqrt{b^2 - a^2}}$ (b) $\frac{b}{a}$

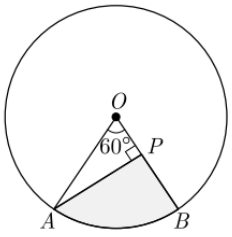
(c) $\frac{\sqrt{b^2 - a^2}}{b}$ (d) $\frac{a}{\sqrt{b^2 - a^2}}$

33. Prove that tangent drawn at any point of a circle perpendicular to the radius through the point contact.

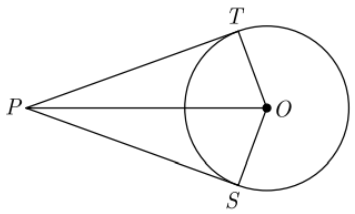
28. Three horses are tied each with 7 m long rope at three corners of a triangular field having sides 20 m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses.

OR

In the given figure, AOB is a sector of angle 60° of a circle with centre O and radius 17 cm. If $AP \perp OB$ and $AP = 15$ cm, find the area of the shaded region.



22. In the given figure, from a point P, two tangents PT and PS are drawn to a circle with centre O such that $\angle SPT = 120^\circ$, Prove that $OP = 2PS$.

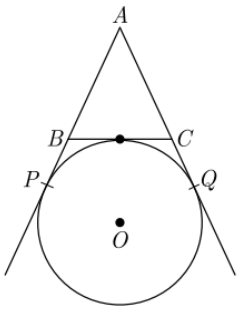


13. The area of a circular ring formed by two concentric circles whose radii are 5.7 cm and 4.3 cm respectively is (Take $\pi = 3.1416$)

(a) 44 sq. cm. (b) 66 sq. cm.

(c) 22 sq. cm. (d) 33 sq. cm.

10. In figure, AP, AQ and BC are tangents of the circle with centre O. If $AB = 5\,\text{cm}$, $AC = 6$ cm and $BC = 4$ cm, then the length of AP (in cm) is

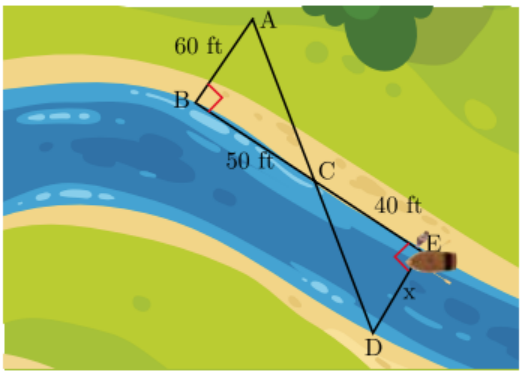


(a) 15 (b) 10

(c) 9 (d) 7.5

3

37. Tania is very intelligent in maths. She always try to relate the concept of maths in daily life. One day she plans to cross a river and want to know how far it is to the other side. She takes measurements on her side of the river and make the drawing as shown below.



(i) Which similarity criterion is used in solving the above problem ?

(ii) Consider the following statement :

$S_1 : \angle ACB = \angle DCE$

$S_2 : \angle BAC = \angle CDE$

Which of the above statement is/are correct.

(a) S_1 and S_2 both (b) S_1

(c) S_2 (d) None

(iii) Consider the following statement :

$S_3 : \frac{AB}{DE} = \frac{CA}{CD}$

$S_4 : \frac{BC}{CE} = \frac{AB}{DE}$

$S_5 : \frac{CA}{CD} = \frac{DE}{AB}$

Which of the above statements are correct ?

(a) S_3 and S_5 (b) S_4 and S_5

(c) S_3 and S_4 (d) All three

(iv) What is the distance x across the river?

OR

What is the approximate length of AD shown in the figure?

36. Maximum Profit : A kitchen utensils manufacturer can produce up to 200 utensils per day. The profit made from the sale of these utensils can be modelled by the function $P(x) = -0.5x + 175x - 330$, where $P(x)$ is the profit in Rupees, and x is the number of utensils made and sold. Based on this model,

(i) Find the y-intercept and explain what it means in this context.

(ii) Find the x-intercepts and explain what they mean in this context.

(iii) How many utensils should be sold to maximize profit?

OR

What is the maximum profit?

33. Two tangents PA and PB are drawn from an external point P to a circle with centre O, such that $\angle APB = \angle x$ and $\angle AOB = y$. Prove that opposite angles are supplementary.

34. The person standing on the bank of river observes that the angle of elevation of the top of a tree standing on opposite bank is $60°$. When he moves 30 m away from the bank, he finds the angle of elevation to be $30°$. Find the height of tree and width of the river.

OR

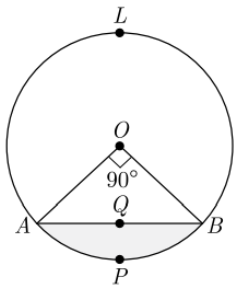
As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are $30°$ and $45°$. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships [Use $\sqrt{3} = 1.732$]

27. If $1 + \sin^2\theta = 3\sin\theta\cos\theta$, prove that $\tan\theta = 1$ or ½.

28. A horse is tethered to one corner of a rectangular field of dimensions 70 m × 52 m, by a rope of length 21 m. How much area of the field can it graze?

OR

In the given figure, a chord AB of the circle with centre O and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment $AQBP$. Hence find the area of major segment $ALBQA$. (Use $\pi = 3.14$)



20. **Assertion :** When a positive integer a is divided by 3, the values of remainder can be 0, 1 or 2.
Reason : According to Euclid's Division Lemma $a = bq + r$, where $0 \leq r < b$ and r is an integer.

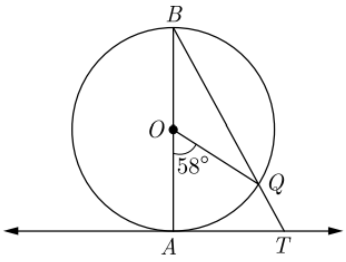
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

22. In given figure, AB is the diameter of a circle with centre O and AT is a tangent. If $\angle AOQ = 58^\circ$, find $\angle ATQ$.



23. Find the value of $\cos 2\theta$, if $2\sin 2\theta = \sqrt{3}$.

13. A sector is cut from a circular sheet of radius 100 cm, the angle of the sector being 240°. If another circle of the area same as the sector is formed, then radius of the new circle is

(a) 79.5 cm (b) 81.5 cm

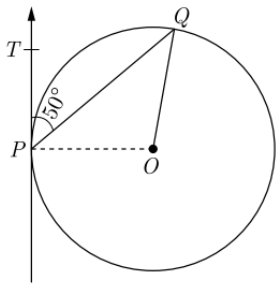
(c) 83.4 cm (d) 88.5 cm

9. ΔABC is an equilateral triangle with each side of length $2p$. If $AD \perp BC$ then the value of AD is

(a) $\sqrt{3}$ (b) $\sqrt{3}\,p$

(c) $2p$ (d) $4p$

10. In figure, O is the centre of circle. PQ is a chord and PT is tangent at P which makes an angle of 50° with $PQ\angle POQ$ is



(a) 130° (b) 90°

(c) 100° (d) 75°

11. If $\cos(\alpha+\beta)=0$, then $\sin(\alpha-\beta)$ can be reduced to

(a) $\cos\beta$ (b) $\cos 2\beta$

(c) $\sin\alpha$ (d) $\sin 2\alpha$

6. The quadratic equation $2x^2-\sqrt{5}\,x+1=0$ has

(a) two distinct real roots

(b) two equal real roots

(c) no real roots

(d) more than 2 real roots

1. If α and β are the zeroes of the polynomial $2x^2 - 13x + 6$, then $\alpha + \beta$ is equal to

(a) -3 (b) 3

(c) $\frac{13}{2}$ (d) $-\frac{13}{2}$

2. If one zero of the polynomial $(3x^2 + 8x + k)$ is the reciprocal of the other, then value of k is

(a) 3 (b) -3

(c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

3. If $3x + 4y : x + 2y = 9 : 4$, then $3x + 5y : 3x - y$ is equal to

(a) 4 : 1 (b) 1 : 4

(c) 7 : 1 (d) 1 : 7

4. The value of k for which the system of linear equations $x + 2y = 3$, $5x + ky + 7 = 0$ is inconsistent is

(a) $-\frac{14}{3}$ (b) $\frac{2}{5}$

(c) 5 (d) 10

5. The roots of the quadratic equation $x^2 - 0.04 = 0$ are

(a) ± 0.2 (b) ± 0.02

(c) 0.4 (d) 2

4

32. Determine graphically whether the following pair of linear equations :

$$3x - y = 7$$
$$2x + 5y + 1 = 0 \text{ has :}$$

unique solution
infinitely many solutions or
no solution.

OR

Solve the following pair of linear equations graphically:
$x + 3y = 12$, $2x - 3y = 12$
Also shade the region bounded by the line $2x - 3y = 2$ and both the co-ordinate axes.

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

34. A vertical tower stands on horizontal plane and is surmounted by a vertical flag-staff of height 6 m. At a point on the ground, angle of elevation of the bottom and top of the flag-staff are 30° and 45° respectively. Find the height of the tower. (Take $\sqrt{3} = 1.73$)

OR

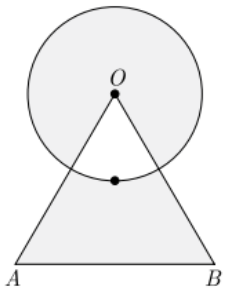
From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression 30° and 45° respectively. Find the distance between the cars. (Use $\sqrt{3} = 1.73$)

27. Prove that $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

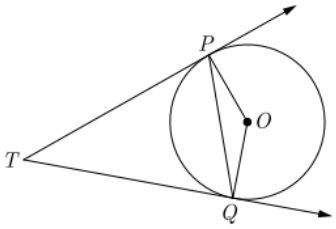
28. The circumference of a circle exceeds the diameter by 16.8 cm. Find the radius of the circle. Use $\pi = \frac{22}{7}$.

OR

Find the area of shaded region shown in the given figure where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



22. In the given figure PQ is chord of length 6 cm of the circle of radius 6 cm. TP and TQ are tangents to the circle at points P and Q respectively. Find $\angle PTQ$.



23. Find the value of $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ is it equal to $\sin 90^\circ$ or $\cos 90^\circ$?

9. Two poles of height 6 m and 11 m stand vertically upright on a plane ground. If the distance between their foot is 12 m, then distance between their tops is

(a) 12 m (b) 14 m

(c) 13 m (d) 11 m

10. Two chords AB and CD of a circle intersect at E such that $AE = 2.4\,\text{cm}$, $BE = 3.2\,\text{cm}$ and $CE = 1.6\,\text{cm}$. The length of DE is

(a) 1.6 cm (b) 3.2 cm

(c) 4.8 cm (d) 6.4 cm

11. If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90^\circ$, then the value of $\tan 5\alpha$ is

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$

(c) 1 (d) 0

12. The ratio of the length of a rod and its shadow is $1:\sqrt{3}$ then the angle of elevation of the sun is

(a) 90° (b) 45°

(c) 30° (d) 75°

13. If a circular grass lawn of 35 m in radius has a path 7 m wide running around it on the outside, then the area of the path is

(a) $1450\,\text{m}^2$ (b) $1576\,\text{m}^2$

(c) $1694\,\text{m}^2$ (d) $3368\,\text{m}^2$

5. **Assertion :** $4x^2 - 12x + 9 = 0$ has repeated roots.
Reason : The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant $D > 0$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

6. If one root of the quadratic equation $ax^2 + bx + c = 0$ is the reciprocal of the other, then

(a) $b = c$ (b) $a = b$

(c) $ac = 1$ (d) $a = c$

1. If one zero of a quadratic polynomial $(kx^2 + 3x + k)$ is 2, then the value of k is

(a) $\frac{5}{6}$ (b) $-\frac{5}{6}$

(c) $\frac{6}{5}$ (d) $-\frac{6}{5}$

2. The zeroes of the polynomial $x^2 - 3x - m(m+3)$ are

(a) $m, m+3$ (b) $-m, m+3$

(c) $m, -(m+3)$ (d) $-m, -(m+3)$

3. The pair of equations $3^{x+y} = 81$, $81^{x-y} = 3$ has

(a) no solution

(b) unique solution

(c) infinitely many solutions

(d) $x = 2\frac{1}{8}, y = 1\frac{7}{8}$

4. The value of k for which the system of equations $x + y - 4 = 0$ and $2x + ky = 3$, has no solution, is

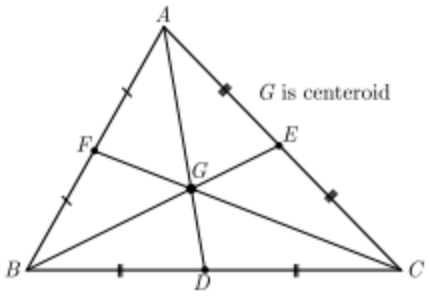
(a) -2 (b) $\neq 2$

(c) 3 (d) 2

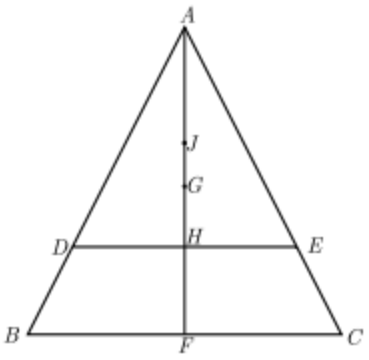
5

37. The centroid is the centre point of the object. It is also defined as the point of intersection of all the three medians. The median is a line that joins the midpoint of a side and the opposite vertex of the triangle. The centroid of the triangle separates the median in the ratio of 2 : 1. It can be found by taking the average of x- coordinate points and y-coordinate points of all the vertices of the triangle.

See the figure given below



Here D, E and F are mid points of sides BC, AC and AB in same order. G is centroid, the centroid divides the median in the ratio 2 : 1 with the larger part towards the vertex. Thus $AG : GD = 2 : 1$
On the basis of above information read the question below.
If G is Centroid of $\triangle ABC$ with height h and J is centroid of $\triangle ADE$. Line DE parallel to BC, cuts the $\triangle ABC$ at a height $\frac{h}{4}$ from BC. $HF = \frac{h}{4}$.

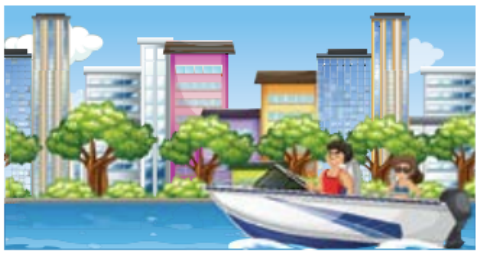


(i) What is the length of AH ?
(ii) What is the distance of point A from point G ?
(iii) What is the distance of point A from point J?

OR

(iv) What is the distance GJ ?

36. John and Priya went for a small picnic. After having their lunch Priya insisted to travel in a motor boat. The speed of the motor boat was 20 km/hr. Priya being a Mathematics student wanted to know the speed of the current. So she noted the time for upstream and downstream.



She found that for covering the distance of 15 km the boat took 1 hour more for upstream than downstream.

(i) Let speed of the current be x km/hr. then speed of the motorboat in upstream will be

(ii) What is the relation between speed distance and time?

(iii) Write the correct quadratic equation for the speed of the current ?

OR

(iv) What is the speed of current ?

32. Aftab tells his daughter, '7 years ago, I was seven times as old as you were then. Also, 3 years from now, I shall be three times as old as you will be.' Represent this situation algebraically and graphically.

OR

Solve the following pair of linear equations graphically:

$x - y = 1,\ 2x + y = 8$

Also find the co-ordinates of the points where the lines represented by the above equation intersect $y-$ axis.

33. From a point T outside a circle of centre O, tangents TP and TQ are drawn to the circle. Prove that OT is the right bisector of line segment PQ.

34. From a point on the ground, the angles of elevation of the bottom and the top of a tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

OR

The angle of elevation of the top B of a tower AB from a point X on the ground is 60°. At point Y, 40 m vertically above X, the angle of elevation of the top is 45°. Find the height of the tower AB and the distance XB.

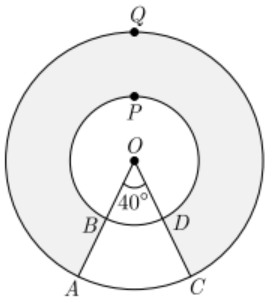
26. Show that the sum of all terms of an AP whose first term is a, the second term is b and last term is c, is equal to $\frac{(a+c)(b+c-2a)}{2(b-a)}$

27. Prove that $(1+\cot A-\operatorname{cosec} A)(1+\tan A+\sec A)=2$

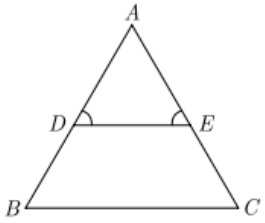
28. Sides of a right triangular field are 25 m, 24 m and 7 m. At the three corners of the field, a cow, a buffalo and a horse are tied separately with ropes of 3.5 m each to graze in the field. Find the area of the field that cannot be grazed by these animals.

OR

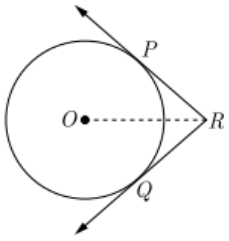
In the given figure, find the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where $\angle AOC=40°$. Use $\pi=\frac{22}{7}$.



21. In Figure $\angle D=\angle E$ and $\frac{AD}{DB}=\frac{AE}{EC}$, prove that ΔBAC is an isosceles triangle.



22. In figure, two tangents RQ and RP are drawn from an external point R to the circle with centre O. If $\angle PRQ=120°$, then prove that $OR=PR+RQ$.



23. If $\sqrt{3}\sin\theta-\cos\theta=0$ and $0°<\theta<90°$, find the value of θ.

18. If $x-2y+k=0$ is a median of the triangle whose vertices are at points $A(-1,3)$, $B(0,4)$ and $C(-5,2)$,then the value of k is

(a) 2 (b) 4

(c) 6 (d) 8

9. In a right angled ΔABC right angled at B, if P and Q are points on the sides AB and BC respectively, then

(a) $AQ^2+CP^2=2(AC^2+PQ^2)$

(b) $2(AQ^2+CP^2)=AC^2+PQ^2$

(c) $AQ^2+CP^2=AC^2+PQ^2$

(d) $AQ+CP=\frac{1}{2}(AC+PQ)$

10. A chord of a circle of radius 10 cm, subtends a right angle at its centre. The length of the chord (in cm) is

(a) $\frac{5}{\sqrt{2}}$ (b) $5\sqrt{2}$

(c) $10\sqrt{2}$ (d) $10\sqrt{3}$

11. If ΔABC is right angled at C, then the value of$\cos(A+B)$ is

(a) 0 (b) 1

(c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$

5. **Assertion :** The equation $x^2+3x+1=(x-2)^2$ is a quadratic equation.
Reason : Any equation of the form $ax^2+bx+c=0$ where $a\neq 0$, is called a quadratic equation.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

6. The linear factors of the quadratic equation $x^2+kx+1=0$ are

(a) $k\geq 2$ (b) $k\leq 2$

(c) $k\geq -2$ (d) $2\leq k\leq -2$

1. The maximum number of zeroes a cubic polynomial can have, is

(a) 1 (b) 4

(c) 2 (d) 3

2. **Assertion :** $(2-\sqrt{3})$ is one zero of the quadratic polynomial then other zero will be $(2+\sqrt{3})$.
Reason : Irrational zeros (roots) always occurs in pairs.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

3. A fraction becomes 4 when 1 is added to both the numerator and denominator and it becomes 7 when 1 is subtracted from both the numerator and denominator. The numerator of the given fraction is

(a) 2 (b) 3

(c) 5 (d) 15

4. The pair of linear equations $2kx+5y=7$, $6x-5y=11$ has a unique solution, if

(a) $k \neq -3$ (b) $k \neq \frac{2}{3}$

(c) $k \neq 5$ (d) $k \neq \frac{2}{9}$

6

36. Nidhi and Ria are very close friends. Nidhi's parents own a Maruti Alto. Ria's parents own a Toyota Liva. Both the families decide to go for a picnic to Somnath temple in Gujrat by their own cars.

Nidhi's car travels x km/h while Ria's car travels 5 km/h more than Nidhi's car. Nidhi's car took 4 hrs more than Ria's car in covering 400 km.

(i) What will be the distance covered by Ria's car in two hour?

(ii) Write the quadratic equation that describe the speed of Nidhi's car?

(iii) What is the speed of Nidhi's car?

OR

How much time did Ria take to travel 400 km?

32. For Uttarakhand flood victims two sections A and B of class contributed Rs. 1,500. If the contribution of X-A was Rs. 100 less than that of X-B, find graphically the amounts contributed by both the sections.

OR

Draw the graph of the following equations:

$$2x - y = 1,\ x + 2y = 13$$

Find the solution of the equations from the graph and shade the triangular region formed by the lines and the y -axis.

33. Prove that the parallelogram circumscribing a circle is a rhombus.

34. From the top of a 7 m high building the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

OR

A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of top and bottom of the flagstaff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower. (take $\sqrt{3} = 1.732$)

27. Prove that $\dfrac{\sin A - \cos A - 1}{\sin A + \cos A - 1} = \dfrac{1}{\sec A - \tan A}$

28. Find the area of minor segment of a circle of radius 14 cm, when its centre angle is 60°. Also find the area of corresponding major segment. Use $\pi = \frac{22}{7}$.

OR

In the given figure, ΔPQR is an equilateral triangle of side 8 cm and D, E, F are centres of circular arcs, each of radius 4 cm. Find the area of shaded region. (Use $\pi = 3.14$) and $\sqrt{3} = 1.732$

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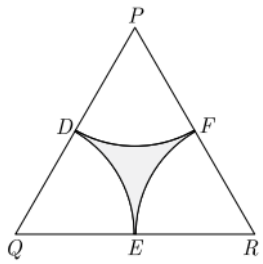
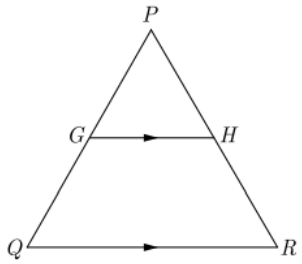
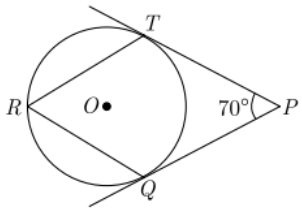


21. In the given figure, G is the mid-point of the side PQ of ΔPQR and $GH \| QR$. Prove that H is the mid-point of the side PR or the triangle PQR.

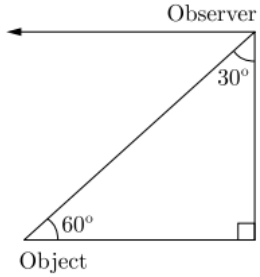


22. In figure, O is the centre of a circle. PT are tangents to the circle from an external point P. If $\angle TPQ = 70^\circ$, find $\angle TRQ$.



23. Evaluate : $\frac{\cos 45^\circ}{\sec 30^\circ} + \frac{1}{\sec 60^\circ}$

12. In the given figure, the positions of the observer and the object are mentioned, the angle of depression is



(a) 30° (b) 90°

(c) 60° (d) 45°

13. The area of the circle that can be inscribed in a square of side 6 cm is

(a) $36\pi \text{ cm}^2$ (b) $18\pi \text{ cm}^2$

(c) $12\pi \text{ cm}^2$ (d) $9\pi \text{ cm}^2$

8. The famous mathematician associated with finding the sum of the first 100 natural numbers is

(a) Pythagoras (b) Newton

(c) Gauss (d) Euclid

9. It is given that, $\Delta ABC \sim \Delta EDF$ such that $AB = 5$ cm, $AC = 7$ cm, $DF = 15$ cm and $DE = 12$ cm then the sum of the remaining sides of the triangles is

(a) 23.05 cm (b) 16.8 cm

(c) 6.25 cm (d) 24 cm

10. QP is a tangent to a circle with centre O at a point P on the circle. If ΔOPQ is isosceles, then $\angle OQR$ equals.

(a) 30° (b) 45°

(c) 60° (d) 90°

11. If $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \frac{1}{2}$, then the value of $(\alpha + \beta)$ is

(a) 0° (b) 30°

(c) 60° (d) 90°

5. If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to their product, then k equals

(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$

(c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

6. **Assertion :** The values of x are $-\frac{a}{2}, a$ for a quadratic equation $2x^2 + ax - a^2 = 0$.
Reason : For quadratic equation $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

1. If α and β are zeroes and the quadratic polynomial $f(x) = x^2 - x - 4$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ is

(a) $\frac{15}{4}$ (b) $\frac{-15}{4}$

(c) 4 (d) 15

2. **Assertion :** If one zero of poly-nominal $p(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of other, then $k = 2$.
Reason : If $(x - \alpha)$ is a factor of $p(x)$, then $p(\alpha) = 0$ i.e. α is a zero of $p(x)$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

3. The pair of equations $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$ has

(a) a unique solution

(b) exactly two solutions

(c) infinitely many solutions

(d) no solution

4. The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. The present ages (in year) of the son and the father are, respectively.

(a) 4 and 24 (b) 5 and 30

(c) 6 and 36 (d) 3 and 24

7

36. Optimal Pricing Strategy : The director of the National School of Drama must decide what to charge for a ticket to the comedy drama. If the price is set too low, the theatre will lose money; and if the price is too high, people

won't come. From past experience she estimates that the profit P from sales (in hundreds) can be approximated by $P(x) = -x^2 + 22x - 40$ where x is the cost of a ticket and $0 \le x \le 25$ hundred rupees.

(i) What is the lowest and highest cost of a ticket that would allow the theatre to break even?

(ii) If theatre charge Rs 4 hundred for each ticket, what is the profit/loss ?

OR

If theatre charge Rs 25 hundred for each ticket, what is the profit/loss ?

(iii) What is the maximum profit which can be earned by theatre ?

32. Solve graphically the pair of linear equations :
$3x-4y+3=0$ and $3x+4y-21=0$
Find the co-ordinates of the vertices of the triangular region formed by these lines and $x-$axis. Also, calculate the area of this triangle.

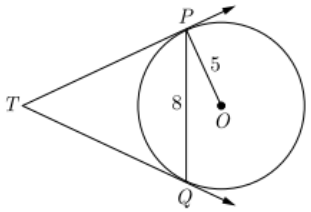
OR

Solve the following pair of equations graphically:

$$2x+3y=12,\ x-y-1=0.$$

Shade the region between the two lines represented by the above equations and the X-axis.

33. In Figure, PQ is a chord of length 8 cm of a circle of radius 5 cm and centre O. The tangents at P and Q intersect at point T. Find the length of TP.



34. Two poles of equal heights are standing opposite to each other on either side of the road which is 80 m wide. From a point P between them on the road, the angle of elevation of the top of a pole is 60° and the angle of depression from the top of the other pole of point P is 30°. Find the heights of the poles and the distance of the point P from the poles.

OR

Two post are k metre apart and the height of one is double that of the other. If from the mid-point of the line segment joining their feet, an observer finds the angles of elevation of their tops to be complementary, then find the height of the shorted post.

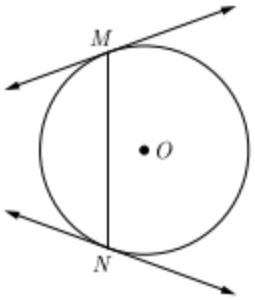
27. Prove that : $2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1=0$

28. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of sector formed by the arc.

OR

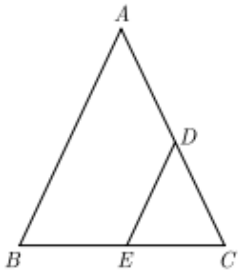
A road which is 7 m wide surrounds a circular park whose circumference is 88 m. Find the area of the road.

22. Prove that tangents drawn at the ends of a chord of a circle make equal angles with the chord.



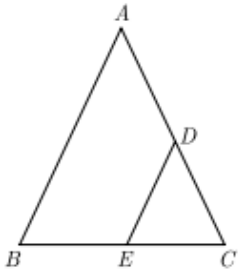
23. Show that : $\dfrac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\tan(30^\circ-\theta)}=1$

21. In the figure of ΔABC, the points D and E are on the sides CA, CB respectively such that $DE||AB$, $AD=2x, DC=x+3, BE=2x-1$ and $CE=x$. Then, find x.

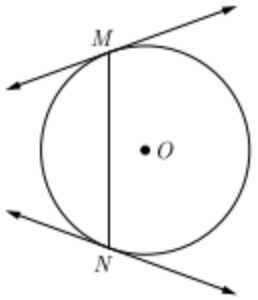


OR

In the figure of ΔABC, $DE||AB$. If $AD=2x$, $DC=x+3, BE=2x-1$ and $CE=x$, then find the value of x.



22. Prove that tangents drawn at the ends of a chord of a circle make equal angles with the chord.



23. Show that : $\dfrac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\tan(30^\circ-\theta)}=1$

15. If the mean of the numbers $27+x$, $31+x$, $89+x$ $107+x, 156+x$ is 82, then the mean of $130+x$, $126+x$, $68+x$, $50+x$, and $1+x$ is

(a) 75 (b) 157

(c) 82 (d) 80

13. The sum of the areas of two circle, which touch each other externally, is $153\,\pi$. If the sum of their radii is 15, then the ratio of the larger to the smaller radius is

(a) 4 : 1 (b) 2 : 1

(c) 3 : 1 (d) None of these

9. **Assertion :** In the $\triangle ABC$, $AB = 24\,\text{cm}$, $BC = 10\,\text{cm}$ and $AC = 26\,\text{cm}$, then $\triangle ABC$ is a right angle triangle.
Reason : If in two triangles, their corresponding angles are equal, then the triangles are similar.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

10. From an external point Q, the length of tangent to a circle is 12 cm and the distance of Q from the centre of circle is 13 cm. The radius of circle (in cm) is

(a) 10 (b) 5

(c) 12 (d) 7

11. If $4\tan\theta = 3$, then $\left(\frac{4\sin\theta - \cos\theta}{4\sin\theta + \cos\theta}\right)$ is equal to

(a) $\frac{2}{3}$ (b) $\frac{1}{3}$

(c) $\frac{1}{2}$ (d) $\frac{3}{4}$

12. **Assertion :** In a circle of radius 6 cm, the angle of a sector 60°. Then the area of the sector is $18\frac{6}{7}\,\text{cm}^2$.
Reason : Area of the circle with radius r is πr^2.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

5. The sum and product of the zeroes of a quadratic polynomial are 3 and -10 respectively. The quadratic polynomial is

(a) $x^2 - 3x + 10$ (b) $x^2 + 3x - 10$

(c) $x^2 - 3x - 10$ (d) $x^2 + 3x + 10$

6. Value(s) of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is/are

(a) 0 (b) 4

(c) 8 (d) 0, 8

1. The value of the polynomial $x^8 - x^5 + x^2 - x + 1$ is

(a) positive for all the real numbers

(b) negative for all the real numbers

(c) 0

(d) depends on value of x

2. If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it

(a) has no linear term and the constant term is negative.

(b) has no linear term and the constant term is positive.

(c) can have a linear term but the constant term is negative.

(d) can have a linear term but the constant term is positive.

3. If a pair of linear equations is consistent, then the lines will be

(a) parallel

(b) always coincident

(c) intersecting or coincident

(d) always intersecting

4. Aruna has only ₹ 1 and ₹ 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is ₹ 75, then the number of ₹ 1 and ₹ 2 coins are, respectively

(a) 35 and 15 (b) 35 and 20

(c) 15 and 35 (d) 25 and 25

8

38. Box : For the box to satisfy certain requirements, its length must be three unit greater than the width, and its height must be two unit less than the width.

(i) If width is taken as x, find the polynomial that represent volume of box.

(ii) Find the polynomial that represent the area of paper sheet used to make box.

(iii) If it must have a volume of 18 unit, what must be its length and height ?

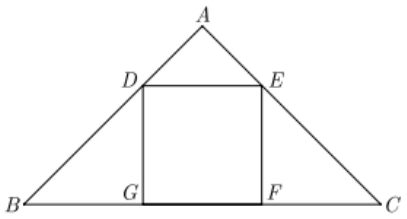
OR

32. Polynomial $x^4+7x^3+7x^2+px+q$ is exactly divisible by $x^2+7x+12$, then find the value of p and q.

OR

If α and β are the zeroes of polynomial $p(x)=3x^2+2x+1$, find the polynomial whose zeroes are $\frac{1-\alpha}{1+\alpha}$ and $\frac{1-\beta}{1+\beta}$.

33. In the given figure, $DEFG$ is a square and $\angle BAC=90^\circ$. Show that $FG^2=BG\times FC$.



34. If $\sin\theta+\cos\theta=\sqrt{3}$, then prove that $\tan\theta+\cot\theta=1$.

OR

Evaluate :

$\tan^2 30^\circ \sin 30^\circ+\cos 60^\circ \sin^2 90^\circ \tan^2 60^\circ-2\tan 45^\circ \cos^2 0^\circ \sin 90^\circ$

35. Four equal circles are described at the four corners of a square so that each touches two of the others. The shaded area enclosed between the circle is $\frac{24}{7}$ cm^2. Find the radius of each circle.

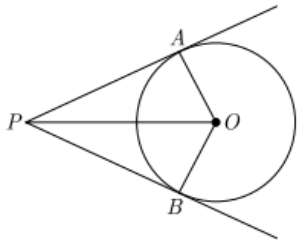
26. Solve graphically :
$2x-3y+13=0;\ 3x-2y+12=0$

27. Solve the following equation: $\frac{1}{x}-\frac{1}{x-2}=3,\ x\neq 0,\ 2$

28. If tangents PA and PB drawn from an external point P to a circle with centre O are inclined to each other at an angle of 80°, then find $\angle POA$.

OR

In the given figure, OP is equal to the diameter of a circle with centre O and PA and PB are tangents. Prove that ABP is an equilateral triangle.



29. The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of a tower from the foot of the building is 60°. If the tower is 50 m high, then find the height of the building.

22. A circle is inscribed in a ΔABC touching AB, BC and AC at P, Q and R respectively. If $AB=10$ cm $AR=7$ cm and $CR=5$ cm, then find the length of BC

11. If $\sin\theta - \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta)$ is

(a) 1 (b) $\frac{3}{4}$

(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

12. If $x = p\sec\theta$ and $y = q\tan\theta$, then

(a) $x^2 - y^2 = p^2q^2$ (b) $x^2q^2 - y^2p^2 = pq$

(c) $x^2q^2 - y^2p^2 = \frac{1}{p^2q^2}$ (d) $x^2q^2 - y^2p^2 = p^2q^2$

13. The length of a string between a kite and a point on the ground is 85 m. If the string makes an angle θ with level ground such that $\tan\theta = \frac{15}{8}$, then the height of kite is

(a) 75 m (b) 78.05 m

(c) 226 m (d) None of these

14. If the angle of depression of an object from a 75 m high tower is 30°, then the distance of the object from the tower is

(a) $25\sqrt{3}$ m (b) $50\sqrt{3}$ m

(c) $75\sqrt{3}$ m (d) 150 m

6. Which of the following statement is false?

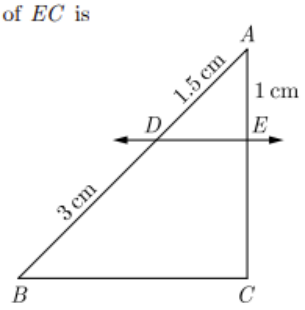
(a) All isosceles triangles are similar.

(b) All quadrilateral are similar.

(c) All circles are similar.

(d) None of the above

7. In the given figure, $DE \parallel BC$. The value of EC is



(a) 1.5 cm (b) 3 cm

(c) 2 cm (d) 1 cm

8. If a regular hexagon is inscribed in a circle of radius r, then its perimeter is

(a) $3r$ (b) $6r$

(c) $9r$ (d) $12r$

9. Two concentric circles are of radii 10 cm and 8 cm, then the length of the chord of the larger circle which touches the smaller circle is

(a) 6 cm (b) 12 cm

(c) 18 cm (d) 9 cm

10. **Assertion :** If in a circle, the radius of the circle is 3 cm and distance of a point from the centre of a circle is 5 cm, then length of the tangent will be 4 cm.

Reason : $(\text{hypotenuse})^2 = (\text{base})^2 + (\text{height})^2$

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

1. Lowest value of $x^2 + 4x + 2$ is

(a) 0 (b) -2

(c) 2 (d) 4

2. The pair of equations $y = 0$ and $y = -7$ has

(a) one solution

(b) two solutions

(c) infinitely many solutions

(d) no solution

3. The equation $2x^2 + 2(p+1)x + p = 0$, where p is real, always has roots that are

(a) Equal

(b) Equal in magnitude but opposite in sign

(c) Irrational

(d) Real

4. **Assertion :** The equation $8x^2 + 3kx + 2 = 0$ has equal roots then the value of k is $\pm\frac{8}{3}$.
Reason : The equation $ax^2 + bx + c = 0$ has equal roots if $D = b^2 - 4ac = 0$

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

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38. Swimming Pool : The volume of water in a rectangular, in-ground, swimming pool is given by $V(x) = x^3 + 11x^2 + 24x$ where $V(x)$ is the volume in cubic feet when the water is x ft high.

(i) Find the dimension of base of pool.

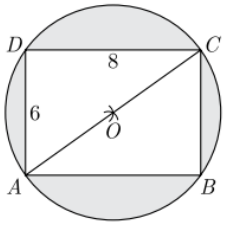
(ii) Use the remainder theorem to find the volume when $x = 3$ ft.

(iii) If the volume is 100 ft^3 of water, what is the height x?

OR

If the maximum capacity of the pool is 520 ft^3 what is the maximum depth?

35. Find the area of the shaded region in Figure, if $ABCD$ is a rectangle with sides 8 cm and 6 cm and O is the centre of circle. (Take $\pi = 3.14$)

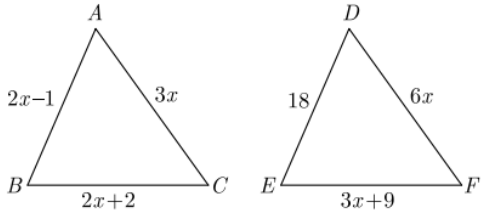


32. If α and β are the zeroes of the polynomial $p(x) = 2x^2 + 5x + k$ satisfying the relation, $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$, then find the value of k.

OR

If β and $\frac{1}{\beta}$ are zeroes of the polynomial $(a^2 + a)x^2 + 61x + 6a$. Find the value of β and α.

33. In Figure, if $\Delta ABC \sim \Delta DEF$ and their sides of lengths (in cm) are marked along them, then find the lengths of sides of each triangle.



34. If $\sec\theta = x + \frac{1}{4x}, x \neq 0$ find $(\sec\theta + \tan\theta)$.

OR

Evaluate :

$\sin^2 30^\circ \cos^2 45^\circ + 4\tan^2 30^\circ + \frac{1}{2}\sin 90^\circ - 2\cos^2 90^\circ + \frac{1}{24}$

26. Solve graphically : $2x + 3y = 2,\ x - 2y = 8$

27. Solve for x : $\frac{1}{x} + \frac{2}{2x-3} = \frac{1}{x-2}, x \neq 0,\ \frac{2}{3},\ 2.$

28. An isosceles triangle ABC, with $AB = AC$, circumscribes a circle, touching BC at P, AC at Q and AB at R. Prove that the contact point P bisects BC.

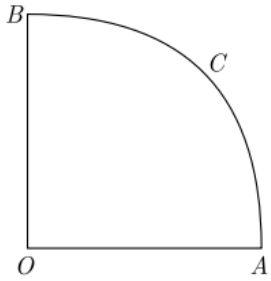
OR

From a point P, which is at a distant of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR are drawn to the circle, then the area of the quadrilateral $PQOR$ (in cm^2).

29. The top of two poles of height 16 m and 10 m are connected by a length l meter. If wire makes an angle of 30° with the horizontal, then find l.

22. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle is bisected at the point of contact.

15. In the given figure, $OACB$ is a quadrant of a circle of radius 7 cm. The perimeter of the quadrant is



(a) 11 cm (b) 18 cm

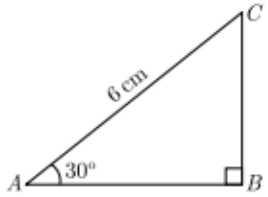
(c) 25 cm (d) 36 cm

10. QP is a tangent to a circle with centre O at a point P on the circle. If $\Delta\, OPQ$ is isosceles, then $\angle\, OQR$ equals.

(a) 30° (b) 45°

(c) 60° (d) 90°

11. In the adjoining figure, the length of BC is



(a) $2\sqrt{3}$ cm (b) $3\sqrt{3}$ cm

(c) $4\sqrt{3}$ cm (d) 3 cm

12. If $b\tan\theta = a$, the value of $\dfrac{a\sin\theta - b\cos\theta}{a\sin\theta + b\cos\theta}$ is

(a) $\dfrac{a-b}{a^2+b^2}$ (b) $\dfrac{a+b}{a^2+b^2}$

(c) $\dfrac{a^2+b^2}{a^2-b^2}$ (d) $\dfrac{a^2-b^2}{a^2+b^2}$

6. **Assertion :** ABC and DEF are two similar triangles such that $BC = 4\,\text{cm}$, $EF = 5\,\text{cm}$ and area of $\Delta ABC = 64\,\text{cm}^2$, then area of $\Delta DEF = 100\,\text{cm}^2$.
Reason : The areas of two similar triangles are in the ratio of the squares of the corresponding altitudes.

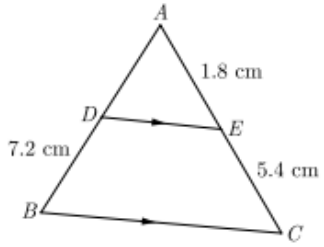
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

7. In Figure, $DE \| BC$. Find the length of side AD, given that $AE = 1.8\,\text{cm}$, $BD = 7.2\,\text{cm}$ and $CE = 5.4\,\text{cm}$.



(a) 2.4 cm (b) 2.2 cm

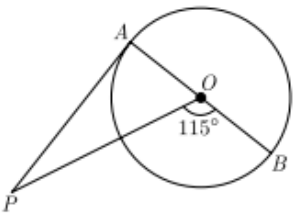
(c) 3.2 cm (d) 3.4 cm

8. Two circles of radii 20 cm and 37 cm intersect in A and B. If O_1 and O_2 are their centres and $AB = 24\,\text{cm}$, then the distance O_1O_2 is equal to

(a) 44 cm (b) 51 cm

(c) 40.5 cm (d) 45 cm

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



(a) 25° (b) 20°

(c) 30° (d) 65°

1. If the sum of the zeroes of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is

(a) 2 (b) -2

(c) 4 (d) -4

2. For what value of k, do the equations $3x - y + 8 = 0$ and $6x - ky = -16$ represent coincident lines ?

(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$

(c) 2 (d) -2

3. The condition for one root of the quadratic equation $ax^2 + bx + c = 0$ to be twice the other, is

(a) $b^2 = 4ac$ (b) $2b^2 = 9ac$

(c) $c^2 = 4a + b^2$ (d) $c^2 = 9a - b^2$

4. The quadratic equation $x^2 + 4x - 3\sqrt{2} = 0$ has

(a) two distinct real roots

(b) two equal real roots

(c) no real roots

(d) more than 2 real roots

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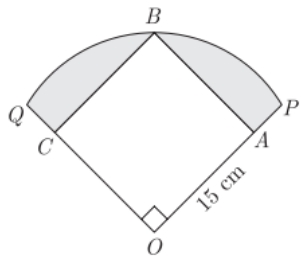
34. If $\sin A = \frac{3}{4}$ calculate $\sec A$.

OR

Evaluate : $4(\sin^4 30^\circ + \cos^4 60^\circ) - 3(\cos^2 45 - \sin^2 90^\circ)$

35. In Figure, a square $OABC$ is inscribed in a quadrant $OPBQ$. If $OA = 15$ cm, find the area of the shaded region. (Use $\pi = 3.14$).



32. Find the zeroes of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeroes and the coefficients.

OR

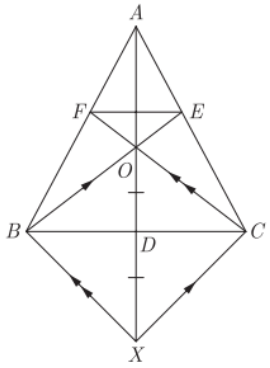
If α and β are the zeroes the polynomial $2x^2 - 4x + 5$, find the values of

(i) $\alpha^2 + \beta^2$ (ii) $\frac{1}{\alpha} + \frac{1}{\beta}$

(iii) $(\alpha - \beta)^2$ (iv) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$

(v) $\alpha^2 + \beta^2$

33. In ΔABC, AD is a median and O is any point on AD. BO and CO on producing meet AC and AB at E and F respectively. Now AD is produced to X such that $OD = DX$ as shown in figure.
Prove that :
(1) $EF \| BC$
(2) $AO : AX = AF : AB$

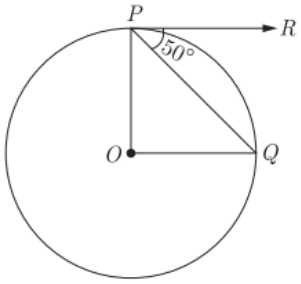


27. Solve for x : $\frac{1}{x+4} - \frac{1}{x+7} = \frac{11}{30}$ $x \neq -4, \ -7$.

28. Prove that the rectangle circumscribing a circle is a square.

OR

If O is centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, find $\angle POQ$.



22. From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\angle PAB = 50^\circ$, then find $\angle AOB$.

15. If the circumference of a circle increases from 4π to 8π, then its area is

(a) halved (b) doubled

(c) tripled (d) quadrupled

11. **Assertion :** The value of $\sin\theta = \frac{4}{3}$ is not possible.
Reason : Hypotenuse is the largest side in any right angled triangle.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

12. $(\cos^4 A - \sin^4 A)$ is equal to

(a) $1 - 2\cos^2 A$ (b) $2\sin^2 A - 1$

(c) $\sin^2 A - \cos^2 A$ (d) $2\cos^2 A - 1$

6. ΔABC is an equilateral triangle with each side of length $2p$. If $AD \perp BC$ then the value of AD is

(a) $\sqrt{3}$ (b) $\sqrt{3}\,p$

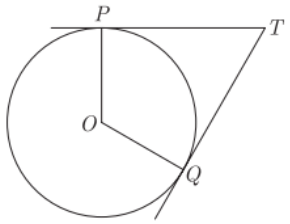
(c) $2p$ (d) $4p$

7. ΔABC and ΔBDE are two equilateral triangle such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is ..... .

(a) 1 : 4 (b) 4 : 1

(c) 1 : 3 (d) 3 : 1

8. In the adjoining figure, TP and TQ are the two tangents to a circle with centre O. If $\angle POQ = 110^\circ$, then $\angle PTQ$ is



(a) 60° (b) 70°

(c) 80° (d) 90°

9. From an external point P, tangents PA and PB are drawn to a circle with centre O. If CD is the tangent to the circle at a point E and $PA = 14$ cm. The perimeter of ΔPCD is

(a) 14 cm (b) 21 cm

(c) 28 cm (d) 35 cm

10. A chord of a circle of radius 10 cm, subtends a right angle at its centre. The length of the chord (in cm) is

(a) $\frac{5}{\sqrt{2}}$ (b) $5\sqrt{2}$

(c) $10\sqrt{2}$ (d) $10\sqrt{3}$

3. If $x^2 + y^2 = 25,\ xy = 12$, then x is

(a) $(3,\ 4)$ (b) $(3, -3)$

(c) $(3, 4, -3, -4)$ (d) $(3, -3)$

4. The quadratic equation $x^2 - 4x - 3\sqrt{2} = 0$ has

(a) two distinct real roots

(b) two equal real roots

(c) no real roots

(d) more than 2 real roots

1. If the square of difference of the zeroes of the quadratic polynomial $x^2 + px + 45$ is equal to 144, then the value of p is

(a) ± 9 (b) ± 12

(c) ± 15 (d) ± 18