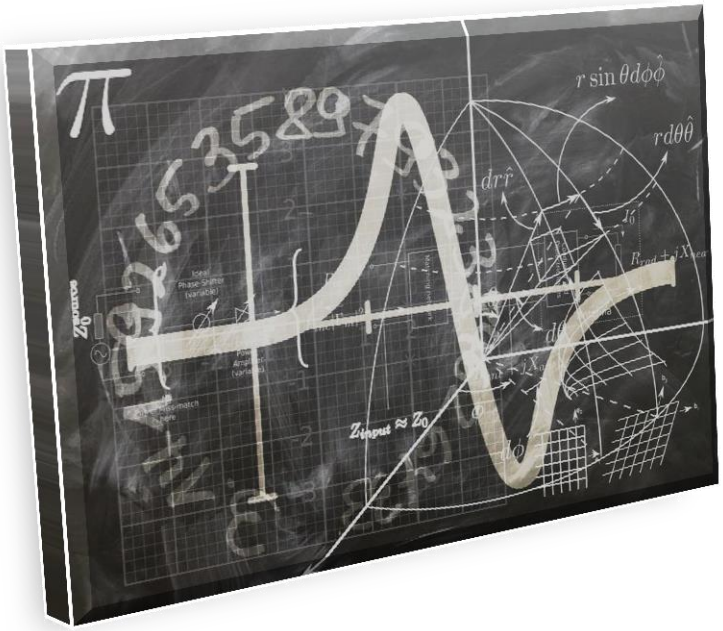


Self Evaluation
SSLC
Mathematics

English (Q & A)

JOHN P A

Self Evaluation

Mathematics Test 1

1 hour

25 scores

1) The difference between fifth term and tenth term of an arithmetic sequence is 20.
What is the difference between 10 th term and 20 th term of the same arithmetic sequence ?

(a) 10 (b) 20 (c) 40 (d) 60

1 score

2) The letters of the word $CACTUS$ are written in small paper pieces and placed in a box.One is taken from the box without looking into the box.

a) What is the probability of getting the letter C?

b) What is the probability of not getting C?

2 score

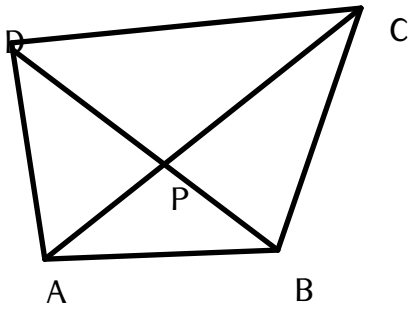
3) The heights of 12 members of a team are listed below.
143 cm , 157 cm , 138 cm, 160 cm, 140cm, 173 cm, 142 cm, 119 cm , 134 cm, 150 cm, 164 cm, 138 cm

a) What is the median height?

b) How many members are there above median height?

2 score

4) In the quadrilateral $ABCD$
$\angle A = 110^\circ$
$\angle C = 70^\circ$



$\angle B = 60^\circ$

a) What is the measure of $\angle D$?

b) Write the relation between PA, PB, PC, PD

c) If $PA = 4, PC = 9, PD = 3$ then what is PB?

3 score

5) The difference in the length of two adjacent sides of a rectangle is 2 and the area 35 square unit.

a) If the smaller side is x then what is the larger side?

b) Write a equation connecting the sides and area of the rectangle.

c) Calculate the sides and the perimetre of the rectangle.

3 score

6) In triangle ABC Length of the sides are : $AB = 8$cm, $AC = 8\sqrt{3}$, $BC = 16$.

a) What kind of triangle is this ?

b) What are the angles of this triangle?

c) What is the distance from A to the mid point of BC?

d) What is the radius of the circle passing through its vertices.

4 score

7) Draw the following geometric figure and answer the question

a) Two angles of a triangle are $50°$ and $75°$.A circle of radius 2.5cm touches its sides inside.

b) Mention the geometric concept used in your method of construction.

5 score

8) Manju has drawn a circle in geogebra axes mod.The vertices of the square $ABCD$ are on a circle with origin at the centre. If the point A is $(4, 4)$ then

a) What is the radius of the circle?

b) What are the coorinates of the points where the circle cut the axes?

c) What are the other vertices of the square?

d) Find the area of the square $ABCD$

5 score

SJ Self Evaluation Series

Answers

1) ⋆ We know that the difference between any two terms of an arithmetic sequence is a multiple of common difference.

⋆ $x_{10} - x_5 = 5d = 20$. So, $x_{20} - x_{10} = 10d = 40$

2) ⋆ There are 6 letters in the word $CACTUS$. The letter C repeats twice.
Probability of getting C is $\frac{2}{6} = \frac{1}{3}$

⋆ Probability of not getting C is $\frac{4}{6} = \frac{2}{3}$

3) a) The arrangement of the numerical data in the

ascending order is given below
$119, 134, 138, 138, 140, 142, 143, 150, 157, 160$
$164, 173$
$n = 12$, so 6 th and 7 th number comes in the middle. They are 142 and 143.
Median is $\frac{142+143}{2} = 142.5$

b) There are 6 members above median.

4) a) $\angle D = 360 - (110 + 70 + 60) = 360 - 240 = 120^\circ$

b) Since opposite angle sum is 180°. $ABCD$ is cyclic.
We can imagine a circle passing through the vertices.
$PA \times PC = PB \times PD$

c) $4 \times 9 = PB \times 3, PB = \frac{36}{3} = 12$cm

5) a) Since one side is x then other side is $x + 2$

b) $x(x + 2) = 35 \to x^2 + 2x = 35$

c) Add 1 on both sides to complete the square.
$x^2+2x+1 = 36, (x+1)^2 = 36, x+1 = 6, x = 5$
Sides are 5 and 7
perimetre $= 2(5 + 7) = 24$unit

6) Draw a rough diagram if necessary, mark the given measures. Sides are in the ratio $1 : \sqrt{3} : 2$

a) This is a right angled triangle.

b) $\angle A = 90^\circ, \angle B = 60^\circ, \angle C = 30^\circ$

c) Since BC is the hypotenuse of the right triangle the distance from A to the mid point of BC will be the radius of the circumcircle , which is half of the hypotenuse. Distance from A to the mid point of BC is 8.

7) ⋆ Draw a circle of radius 2.5cm with centre O

⋆ Divide the angle around O into $2 \times 50 = 100^\circ$ and $2 \times 75 = 150^\circ$ by drawing radii

⋆ Complete the triangle by joining the ends of the radii.

⋆ Angle formed by the arc at the centre is two times angle in the complement.

8) a) Radius of the circle is $4\sqrt{2}$

b) $(4\sqrt{2}, 0), (0, 4\sqrt{2}), (-4\sqrt{2}, 0), (0, -4\sqrt{2})$

c) Vertices of the square are $(4, 4), (-4, 4), (-4, -4), (4, -4)$

d) $AB = 8$. Area of the square is $8^2 = 64$ sq.unit

[1]

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Self Evaluation

Mathematics Test 2

1 hour

25 scores

1) Algebraic form of an arithmetic sequence is $\frac{3}{7}n+1$. What is the first integer term of this sequence?

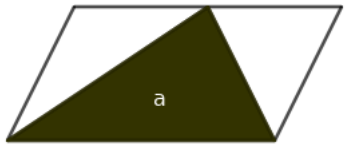
(a) 4 (b) 7 (c) 12 (d) 6

1 score

2) Black triangle is drawn inside a parallelogram such that the one side of the triangle coincides on side of the parallelogram and opposite vertex is on the opposite side.If the area triangle is a then

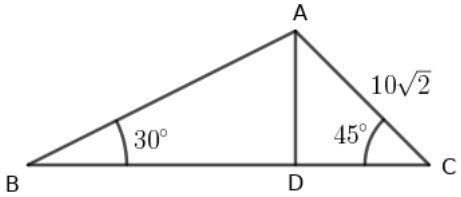
a) What is the area of the parallelogram?

b) A fine dot is placed into the figure without looking into the figure. What is the probability of falling the dot in the black triangle?



2 score

3) In triangle ABC , AD is perpendicular to BC, $\angle B = 30^\circ$ and $\angle C = 45^\circ$, $AC = 10\sqrt{2}$cm



a) What is the length of the altitude to BC?

b) What is the length of the side AB?

2 score

4) A semicircular plate of radius 10cm is rolled into a cone.

a) What is the slant height of the cone?

b) What is the radius of the cone?

c) Calculate the curved surface area of the cone?

3 score

5) $(-1,1),(2,-2),(-3,3)$ are three points on a line.

a) Write the coordinates of another point on this line?

b) What is the slope of this line?

c) Write the general relation between the coordinates of points on line that you observe from the given points .

3 score

6) $p(x) = x^3 - 4x^2 + 7x - 4$ is a third degree polynomial.

a) Find $p(1)$

b) Write a first degree factor of this polynomial.

c) Which number should be added to $p(x)$ to get a polynomial $q(x)$ in which $x + 1$ is a factor?

4 score

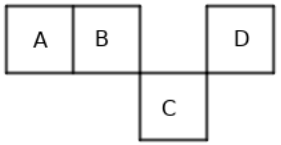
7) Two angles of a triangle are $70°$ and $80°$.The vertices of the triangle are on a circle of radius 3 cm.

a) Construct the triangle.

b) Write the principle of construction.

5 score

8) The squares are taken from a calandar . Each square contains a day number.



a) If $A = x$ write B, C and D

b) If $C \times D = 91$ then form a second degree equation in x

c) Find x by solving the equation.

d) Write B, C and D

5 score

SJ Self Evaluation Series

Answers

1) ⋆ If $n = 7$then $x_7 = \frac{3}{7} \times 7 + 1 = 4$

⋆ Correct option is a

2) One side of the triangle and altitude to the side is equal to side and altitude of the parallelogram

a) $2a$

b) $\frac{1}{2}$

3) $\triangle ADC$is a $45° - 45° - 90°$right triangle .
$AD = CD = 10$cm
Triangle $ADB$is a $30° - 60° - 90°$right triangle .Side

opposite to 30° is 10cm .
$BD = 10\sqrt{3}$cm

a) $BC = 10\sqrt{3} + 10$

b) $AB = 20$cm

4) a) $l = 10$cm

b) $lx = 360r \rightarrow 10 \times 180 = 360 \times r$
$r = \frac{10 \times 180}{360} = 5$cm

c) $\pi rl = 50\pi$sq.cm

5) a) $(4, -4)$ or any pair with the sum of $x$coordinates and y coordinates is 0

b) slope $= \frac{y_2 - y_1}{x_2 - x_1} = -1$

c) $x = -y$ or $y = -x$ or $x + y = 0$

6) a) $p(1) = 1^3 - 4 \times 1^2 + 7 \times 1 - 4 = 1 - 4 + 7 - 4 = 0$

b) $x - 1$

c) Number to be added is k
$q(x) = x^3 - 4x^2 + 7x - 4 + k$
$q(-1) = 0 \rightarrow (-1)^3 - 4(-1)^2 + 7(-1) - 4 +$
$k = 0$
$k = 16$

7) $\star$ Draw a circle of radius 3cm

$\star$ Two angles are 70° and 80°. Take twice of these angles $140^\circ - 160^\circ$. Divide the angle around the centre as $140^\circ - 160^\circ$

$\star$ Three radii should be drawn . Draw a triangle by joining the ends of the radii

b) Angle formed by the arc at the centre is twice the angle in the complement.

8) a) $B = x + 1, C = x + 9, D = x + 3$

b) $(x + 9)(x + 3) = 91 \rightarrow x^2 + 12x + 27 = 91, x^2 + 12x = 91 - 27 = 64$
$x^2 + 12x + 36 = 64 + 36 = 100$
$(x + 6)^2 = 100, x + 6 = 10, x = 4$

c) $B = 5, C = 13, D = 7$

1

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Self Evaluation

Mathematics Test 3

1 hour

25 scores

1) In the polynomial $p(x) = ax^3 + bx^2 + cx + d$, $a + b = -7, c + d = 7$ then which of the following is always a factor of $p(x)$?

(a) $x - 1$ (b) $x + 1$ (c) $x + 2$ (d) $x - 2$

1 score

2) In triangle ABC if $A(0, 0), B(6, 0), C(0, 8)$ then

a) What is the mid point of the side BC?

b) What is the radius of the circle passing through the vertices?

2 score

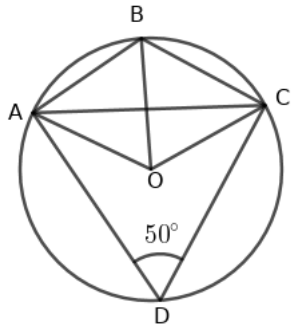
3) The radius and height of a cone are equal. Slant height is 12 cm

a) What is the radius ?

b) Find the curved surface area of the cone

2 score

4) In the figure O is the centre of the circle. $AB = BC$, $\angle ADC = 50^\circ$



a) What is the measure of $\angle AOC$?

b) What is the measure of $\angle ABC$

c) What is the measure of $\angle BAC, \angle BCA$

3 score

5) $97, 94, 91 \cdots$ എന്ന സമാന്തരശ്രേണി പരിഗണിക്കുക

a) What is the common difference ?

b) Write the algebraic form of this sequence?

c) Which is the first negative term of this sequence?

3 score

6) Sum of the area of two squares is 116sq.cm .The difference between the perimetres is 24.

a) If the side of the small square is x then what is the side of the big square?

b) Form a second degree equation.

c) Calculate the side of the squares .

4 score

7) One side of a triangle is 6cm.Angle at the ends of this side are $40°, 60°$.

a) Draw the triangle.

b) Construct the circle which touches its sides.

5 score

8) A child standing in the bank of a river observes the top of a tree on the other side of the river at an angle of elevation $60°$. When moves 20metre back the top of the tree is found at the angle $30°$.

a) Draw a rough diagram

b) Calculate the height of the tree.

c) Calculate the width of the river.

5 score

SJ Self Evaluation Series

Answers

1) $\star\ a+b+c+d=-7+7=0$.That is $p(1)=0$

$\star\ x-1$ is always a factor

2) Triangle $ABC$is a right triangle .$\angle A=90°$

a) Mid point of BC is $(\frac{0+6}{2},\frac{8+0}{2})=(3,4)$

b) $BC=\sqrt{6^2+8^2}=10$.
Radius of the circumcircle 5

3) h, r, lform a
$45°-45°-90°$triangle

a) $r=\frac{12}{\sqrt{2}}=6\sqrt{2}$cm

b) $\pi rl=72\sqrt{2}\pi$sq.cm

4) a) $\angle AOC=100°$

b) $\angle ABC=180-50=130°$

c) $\angle BAC=\angle BCA=\frac{180-130}{2}=25°$

5) a) $d=94-97=-3$

b) $x_n=dn+(f-d)=-3n+(97-^-3)=-3n+100$

c) $-3n+100<0\rightarrow -3n<-100$
$3n>100, n>\frac{100}{3}$
$n>33.33, n=34$

$x_{34} = -3 \times 34 + 100 = -2$

First negative term is -2

6) a) If the larger side is y,$4y - 4x = 24, y - x = 6, y = x + 6$

b) $x^2 + (x+6)^2 = 116, x^2 + x^2 + 12x + 6^2 = 116$
$2x^2 + 12x + 36 = 116$, $x^2 + 6x = 40$

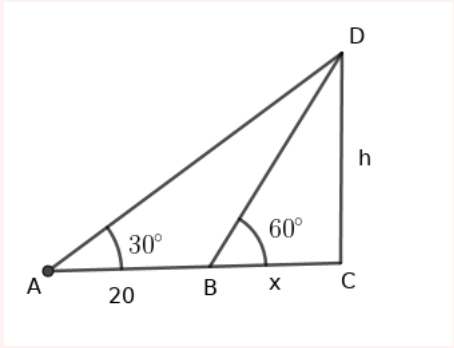
c) $x^2 + 6x + 9 = 49, (x+3)^2 = 49, x + 3 = 7, -7$
$x = 7 - 3 = 4$. sides are $x = 4$cm , $y = 6 + 4 = 10$ cm

7) ⋆ Draw a triangle using the given measurements

⋆ Draw the bisectors of two angles. They intersect at a point.

⋆ Draw perpendicular from this point to the side . Take the intersecting point of the angle bisectors as the centre and perpendicular distance to the side as diametre , draw the circle.

8) a) Draw figure



b) Triangle $BCD$is a $30° - 60° - 90°$triangle .
$BC = x$, $h = \sqrt{3}x$
Triagle ACD is a $30° - 60° - 90°$triangle .
$20 + x = \sqrt{3}h = \sqrt{3} \times \sqrt{3}x$
$20 + x = 3x, 20 = 2x, x = 10$metre

c) Height of the tree $= \sqrt{3}x = 10\sqrt{3}$metre

d) Width of the river 10metre

1

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Self Evaluation

Mathematics Test 4

1 hour

25 scores

1) What is the mean of first 100 odd numbers?

(a) 100 (b) 200 (c) 300 (d) 120

1 score

2) Angle sum of a 9sided polygon is 1260°.The angles arranged in the ascending order makes an arithmetic sequence.

a) Which angle comes as the middle term of the sequence ?

b) If the smallest angle is 104° then what is the largest angle?

2 score

3) $p(x) = 3x^3 + 5x^2 - 7x + 1$ is a third degree polynomial.

a) Find $p(1)$

b) Write the first degree factor of $p(x) - p(1)$

2 score

4) A box contains 6 black balls and 4 white beads.A bead is taken from the box at random.

a) What is the probability of getting a black dot?

b) One black bead is removed and some white beads are added into the box.The probability of getting white bead becomes two times the probability of getting black bead.How many white beads are added?

c) How many beads are there in the box now ?

3 score

5) A chord AB of length 18 cm is drawn in a circle.The ends of the chord makes 120° at the centre of the circle.

a) Draw a rough diagram.

b) Draw a diametre from A as Ac and join BC.What is the angle between AC and BC?

c) What is the radius of the circle?

3 score

6) In triangle ABC, $A(-3, 2), B(7, 2), C(4, 12)$.

a) Which side is parallel to x axis ?

b) What is the length $AB$and altitude to AB?

c) Calculate the area of the triangle.

4 score

7) An wooden square prism has base edge 10cm and height 12cm.A cone of largest size is carved from the prism.

a) What is the radius of the cone?

b) What is the height of the cone?

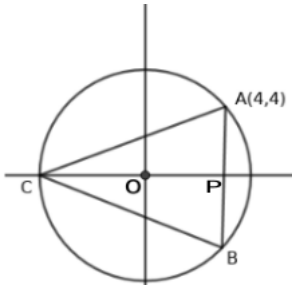
c) Find the slant height of the cone?

d) Calculate the total surface area of the cone?

e) Calculate the volume of the cone.

5 score

8) $A(4,4)$ is a point on the circle with origin as the centre. Chord AB is parallel to y axis.



a) Write the coordinates of B

b) Write the coordinates of C

c) What is the measure of angle ACB

d) Calculate the area of triangle AB using the lengths AB and PC.

5 score

SJ Self Evaluation Series

Answers

1) ⋆ Sum of first 100odd numbers is 100^2.

⋆ Mean$= \frac{100^2}{100} = 100$

2) a) Middle term (fifth term)$= \frac{1260}{9} = 140$

b) $x_5 - x_1 = 4d = 140 - 104 = 36$

$x_9 = x_5 + 4d = 140 + 36 = 176$

3) a) $p(1) = 3 \times 1^2 + 5 \times 1^2 - 7 \times 1 + 1 = 2$

b) $x - 1$ is a factor of $p(x) - p(1)$

4) a) $\frac{6}{10}$

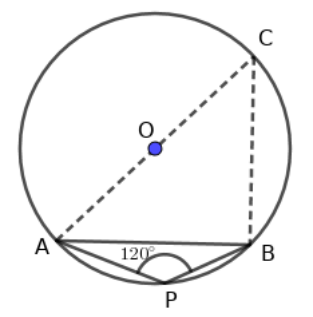
b) When 1black bead is removed anf x white beads are added

$\frac{5}{9+x} \times 2 = \frac{4+x}{9+x}$

$10 = 4 + x, x = 6$

c) There are 15beads in the box ?

5) a) picture



b) $APBC$ is a cyclic quadrilateral .
$\angle ACB = 180 - 120 = 60°$

c) $\triangle ABC$ is a $30, 60, 90$ right triangle .
Side opposite to $60°$ is 18.
Side opposite to $30°$ is $\frac{18}{\sqrt{3}} = 6\sqrt{3}$
Diametre $= 2 \times 6\sqrt{3}$.
Radius $= 6\sqrt{3}$cm

6) a) y coordinates of A and B are equal . Side AB is parallel to x axis

b) $AB = \mid 7 - ^{-} 3 \mid = 10$
Height $= \mid 12 - 2 \mid = 10$.

c) Area $= \frac{1}{2} \times 10 \times 10 = 50$

7) a) $r = 5$cm

b) $h = 12$cm

c) $l = \sqrt{12^2 + 5^2} = \sqrt{169} = 13$cm

d) Total surface area
$\pi r^2 + \pi r l = 90\pi$ sq.cm

e) Volume $= \frac{1}{3}\pi r^2 h = 100\pi$ cubic cm

8) a) $B(4, -4)$

b) $\triangle AOP$ is a $45°, 45°, 90°$ triangle
$OA = 4\sqrt{2}$. $C(-4\sqrt{2}, 0)$

c) $\angle AOP = \angle BOP = 45°$
$\angle AOB = 90°, \angle ACB = \frac{90}{2} = 45°$

d) $AB = 8$,$CP = 4 + 4\sqrt{2}$
Area $\frac{1}{2} \times (4 + 4\sqrt{2}) \times 8 = 16 + 16\sqrt{2}$

1

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Self Evaluation

Mathematics Test 5

1 hour

25 scores

1) What is the position of the vertex of an equilateral triangle based on a circle with opposite side as the diametre.

(a) Inside the circle (b) On the circle (c) Outside the circle (d) Anywhere

1 score

2) $A(1,0), B(0,1), C(-1,0), D(0,-1)$ are the vertices of a squdrilateral

a) Suggest a suitable name to $ABCD$

b) What is the length of a side?

2 score

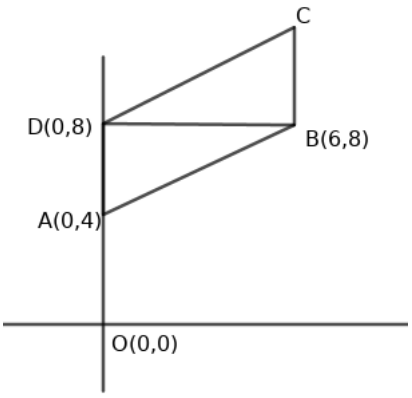
3) $p(x) = x^3 + 1, q(x) = x^3 + x^2 + x + 1$

a) If $p(a) = q(a) = 0$ then what is a?

b) Write the common first degree factor of these polynomials

2 score

4) $ABCD$ is a parallelogram , $A(0,4), B(6,8), D(0,8)$.



a) Write the coordinates of C

b) What is the length of the diagonal BD

c) Calculate the area of the parallelogram

3 score

5) Consider the arithmetic sequence $1, 5, 9, 13 \cdots$

a) What is the common difference of this sequence ?

b) What is the remainder when the terms are divided by its common difference ?

c) Which is the first three digit term of this sequence ?

3 score

6) The weights of 12members of a group are given below .

Weight	67	70	72	73	75
Number of members	4	3	2	2	1

a) What is the median weight?

b) How many members are there above median weight?

4 score

7) The smallest side of a right triangle is 4 less than its hypotenuse.Third side is 2 more than the smallest side.

a) If the smallest side is x then write the length of hypotenuse and third side?

b) Write the equation connecting the sides of the triangle.

c) What is the length of the smallest side ?

d) Write the sides of the triangle.

5 score

16) The top of a building can be seen at an angle of elevation 45° from a point some distance from the base . When move 20 metre towards the tower the nngle becomes 60°.

a) Draw a rough diagram .

b) Write equations using the given conditions .

c) Calculate the distance from the base of the tower to the points of observation.

d) Calculate the height of the tower.

5 score

SJ Self Evaluation Series

Answers

1) ⋆ All angles are 60°, less than 90°.

⋆ Vertex is outside the circle.

2) a) Square

b) Side= $\sqrt{2}$

3) a) $p(-1) = (-1)^3 + 1 = -1 + 1 = 0$
$q(-1) = (-1)^3 + (-1)^2 + (-1) + 1 = -1 + 1 - 1 + 1 = 0$
$a = -1$

b) Common factor $x + 1$

4) a) $C(6, 12)$

b) $BD = 6$

c) Area $= AD \times BD = 4 \times 6 = 24$

5) a) $d = 5 - 1 = 4$

b) 1

c) When $101$is divided by 4 we get the remainder 1. First three digit term is 101

6) a) Table

Weight	No
upto 67	4
upto 70	7
upto 72	9
upto 73	11
upto 75	12

b) $n = 12$(Even). Sixth and seventh comes in the middle .
Median 70

c) Number below median is 4.

d) Number above median is 5

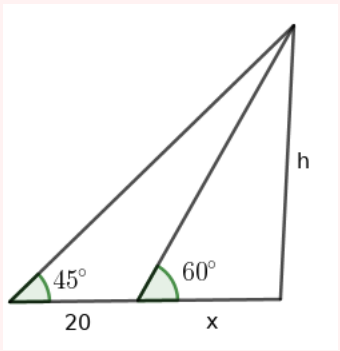
7) a) If smallest side $x$then hypotenuse is $= x + 4$, third side $x + 2$

b) $(x + 4)^2 = (x + 2)^2 + x^2, x^2 + 8x + 16 = x^2 + 4x + 4 + x^2$
$x^2 - 4x - 12 = 0$

c) $x^2 - 4x = 12, x^2 - 4x + 4 = 12 + 4$
$(x - 2)^2 = 16, x - 2 = 4, x = 6$
smallest side is 6

d) sides are $6, 8, 10$

8) a) Diagram.



b) $h = \sqrt{3}x$
$h = 20 + x$

c) $\sqrt{3}x - x = 20, x = \frac{20}{\sqrt{3}-1} = \frac{20}{0.73} = 27.39$metre

d) $h = 20 + x = 20 + 27.39 = 47.39$metre

1

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Self Evaluation

Mathematics Test 5

1 hour

25 scores

1) In the polynomial $p(x)$,if $p(1) = 5$ then what is the factor of $p(x) - 5$?

(a) $x + 1$ (b) $x - 1$ (c) $x + 2$ (d) $x - 2$

1 score

2) $x^2 + y^2 = r^2$ is the equation of a circle with centre origin and radius r.

a) What is the radius of the circle $x^2 + y^2 = 36$?

b) What are the coordinates of the point where the circle cut the axes?

2 score

3) The sum of a number and its square is 30 .

a) If x is the number write the equation using the given condition.

b) What are solutions of this equation.

2 score

4) Diametre of a sphere is 6cm .

a) Calculate the surface area of the sphere.

b) If it is cut off into two hemispheres then what is the curved surface area of a hemisphere?

c) Calculate the total surface area of the hemisphere.

3 score

5) The numbers $2, 3, 4$ are written in small paper pieces and placed in a box.The fractions $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ are written in another paper pieces and placed in another box.One is taken from each box at random.

a) How many pairs are possible as outcome?

b) What is the probability of getting the product in the pair a natural number?

c) What is the probability of not getting the product in the pair a natural number?

3 score

6) Draw a rectangle with the sides 6 cm and , 4cm . Construct a square whose area equal to area of the rectangle.Measure the length of the side of the square and write aside .

4 score

7) You are familiear with the addition of first n natural numbers. Look at the pattern carefully

$$1^3 = 1$$

$$1^3 + 2^3 = 9 = 3^2 = (1+2)^2$$

$$1^3 + 2^3 + 3^3 = 36 = 6^2 = (1+2+3)^2$$

Observing this pattern answer the questions given below .

a) How many cubical numbers are there among the natural numbers from 1 to 8000?

b) What is the sum $1^3 + 2^3 + 3^3 + 4^3$

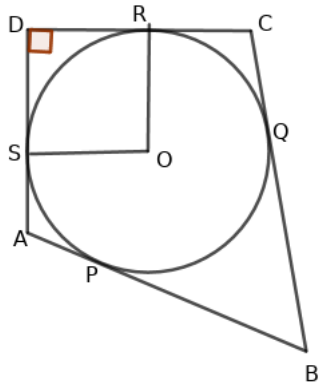
c) Write the sum of the cubes of natural numbers from 1 to 6

d) The sum of the first 10 natural numbers is 55. what is the sum $1^3 + 2^3 + 3^3 \cdots 10^3$

e) Write the formula for calculating $1^3 + 2^3 + 3^3 \cdots + n^3$

5 score

8) In the quadrilateral $ABCD$, $\angle D = 90^\circ$
The sides AB, BC, CD, DA touches the circle at P, Q, R, S.
$BC = 38$cm , $CD = 25$ cm , $BP = 27$cm



a) How do we know $ORDS$ a square ?

b) What us the length CQ?

c) What is the length of the square $ORDS$

d) What is the radius of the circle?

5 score

SJ Self Evaluation Series

Answers

1) ⋆ $p(x) - p(a)$ has a factor $x - a$.
⋆ $x - 1$

2) a) $x^2 + y^2 = 36 \to x^2 + y^2 = 6^2$
$r = 6$
b) $(6, 0), (0, 6), (-6, 0), (0, -6)$

3) a) $x^2 + x = 30$
b) $x^2 + x + \frac{1}{4} = 30 + \frac{1}{4}$
$(x + \frac{1}{2})^2 = \frac{121}{4}$
$(x + \frac{1}{2}) = \frac{11}{2}, \frac{-11}{2}$
$x = \frac{11}{2} - \frac{1}{2} = 5$

$x + \frac{1}{2} = \frac{-11}{2}$
$x = \frac{-11}{2} - \frac{1}{2} = \frac{-12}{2} = x = -6$

4) a) Total surface area $= 4\pi r^2 = 36\pi$sq.cm

b) $2\pi r^2 = 18\pi$sq.cm

c) $2\pi r^2 = 18\pi, \pi r^2 = 9\pi$
Total surface area $= 3\pi r^2 = 27\pi$sq.cm

5) a) Number of pairs $= 3 \times 3 = 9$
$(2, \frac{1}{2}), (2, \frac{1}{3}), (2\frac{1}{4})$
$(3, \frac{1}{2}), (3, \frac{1}{3}), (3\frac{1}{4})$
$(4, \frac{1}{2}), (4, \frac{1}{3}), (4\frac{1}{4})$

b) Pairs giving the product a natural number are $(2, \frac{1}{2}), (3, \frac{1}{3}), (4, \frac{1}{4}), (4, \frac{1}{2})$
There are 4pairs .
Probability of getting the product a natural number is $= \frac{4}{9}$

c) Probability of not getting the product a natural number is $1 - \frac{4}{9} = \frac{5}{9}$

6) ⋆ Draw the rectangle $ABCD$. $AB = 6$cm , $BC = 4$cm .

⋆ Produce AB to E such that $BC = BE$

⋆ Draw a semicircle with diametre AE. Produce BC to cut the semicircle at F.

⋆ $BA \times BE = BF^2$ becomes $AB \times BC = BF^2$. $AB \times BC$ is the area of the rectangle.

⋆ Draw a square with side BF. $AB \times BC = BF^2$

7) a) $1^3 = 1, 20^3 = 8000$. Therefore 20perfect squares

b) $(1 + 2 + 3 + 4)^2 = 10^2 = 100$

c) 55^2

d) $(\frac{n(n+1)}{2})^2$

8) a) OD is the tangent and OR is the radius . So OD is perpendicular to OR.
So AD is perpendicular to OS, $\angle D = 90^\circ$. $ORDS$is a rectangle, $\angle O$ will be 90° , $DR = DS$.All sides are equal and all angles are 90°. So it is a square

b) $BP = BQ = 27$, $BC = 38$,$QC = 38 - 27 = 11$cm

c) $CQ = CR = 11$cm, $DR = CD - 11 = 25 - 11 = 14$cm
Side of $ORDS$ is 14 cm

d) $r = 14$cm

1

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Self Evaluation

Mathematics Test 5

1 hour

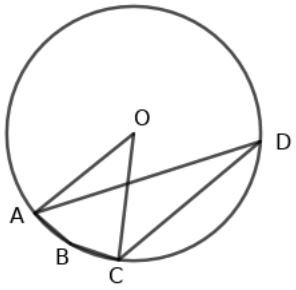
25 scores

1) How many odd numbers from 1 to n in an order makes the sum 400?

(a) 20 (b) 30 (c) 50 (d) 25

1 score

2) O is the centre of the circle.If $\angle AOC = 80°$then



a) What is the measure of $\angle ADC$?

b) What is the measure of $\angle ABC$?

2 score

3) Triangle ABC is an equilateral triangle . If $A(1,1), B(7,1)$then

a) What is the length of its side ?

b) Write the coordinates of C

2 score

4) If each side of a square is reduced by 1 we get a new square of area 100sq.cm .

a) If x is the side then form an equation.

b) Find the side of the square .

c) What change occur in the area if the side is reduced by 1

3 score

5) Consider an equilateral triangle of side 10cm

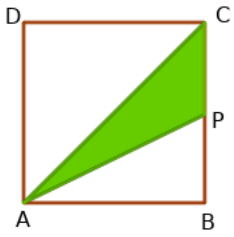
a) What is the altitude ?

c) What is the area of the square with altitude as the side ?

d) What is the length of its diagonal .

3 score

6) $ABCD$ is a square, a triangle is shaded inside . P is the mid point of a side .



a) If the side of the square is a then what is the altitude to the side PC of the triangle.

b) If a is the side of the square then what is the area of the shaded triangle?

c) If a fine dot is placed into the figure then what is the probability of falling the dot in the shade?

4 score

7) Consider the points $A(2,0), B(-6,-2), C(-4,-4), D(4,-2)$

a) What is the slope of AB and CD

b) Find the slope of AD and BC

c) Is $ABCD$ a parallelogram?

5 score

8) The marks obtained by the students of a class are given below .

Marks	Number of houses
0 - 10	4
10 - 20	8
20 - 30	10
30 - 40	9
40 -50	5

a) Form a table for calculating the median.

b) In which class the middle mark occurs

c) What is the mark of 13 th student ?

d) What are the marks comes in the middle?

e) Calculate the median mark.

5 score

Answers

1) ⋆ Sum of first n odd numbers $= n^2$

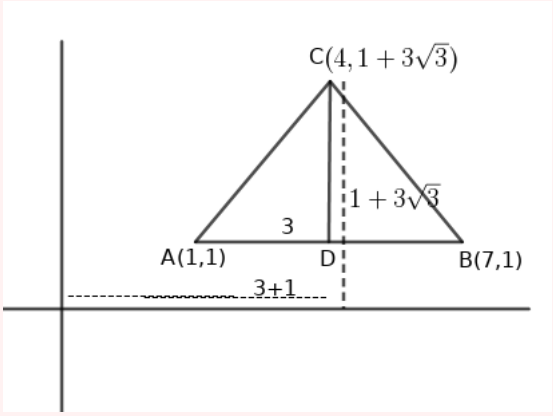
⋆ Number of odd numbers make the sum 400 is $= \sqrt{400} = 20$

2) a) $\angle ADC = \frac{80}{2} = 40°$

b) $\angle ABC = 180 - 40 = 140°$

3) a) $AB = \mid 7 - 1 \mid = 6$

b) Altitude is $3\sqrt{3}$
$C(4, 1 + 3\sqrt{3})$



4) a) If the side x then $(x-1)^2 = 100$

b) $x - 1 = \sqrt{100} = 10$
$x = 11$. area $11^2 = 121$sq.cm

c) If the side is reduced by 1 then side is 10.Area is $10^2 = 100$
Difference of area $121 - 100 = 21$sq.cm

5) a) $5\sqrt{3}$

b) $(5\sqrt{3})^2 = 75$

c) $5\sqrt{3} \times \sqrt{2} = 5\sqrt{6}$

6) a) $AB$is the altitude to the side PC.
$AB = a$, height $= a$

b) Base of $\triangle APC$ is $= \frac{a}{2}$,height $= a$
area $= \frac{1}{2} \times \frac{a}{2} \times a = \frac{a^2}{4}$

c) probability$= \frac{a^2}{4} \div a^2 = \frac{1}{4}$

7) a) Slope of AB is $\frac{-2-0}{-6-2} = \frac{-2}{-8} = \frac{1}{4}$
Slope of CD is $= \frac{-2-^-4}{4-^-4} = \frac{2}{8} = \frac{1}{4}$
Line AB is parallel to CD

b) Slope of AD is $= \frac{-2-0}{4-2} = \frac{-2}{2} = -1$
Slope of BC is $\frac{-4-^-2}{-4-^-6} = \frac{-2}{2} = -1$
Line AD is parallel to BC.

c) Since opposite sides are parallel $ABCD$ is a parallelogram .

8) a) Look at the table

Marks	Number
Below 10	4
Below 20	12
Below 30	22
Below 40	31
Upto 50	36

b) $n = 36$,even number , 18th and 19 th terms comes in the middle .In belongs to the class $20 - 30$

c) On dividing 10marks among 10pupils equally each one's share is 1.
Thirteenth mark is $= 20 + \frac{1}{2} = 20.5$

d) 18th mark is the 8 th term of the arithmetic sequence . common difference is 1.
$x_6 = f + 5d = 20.5 + 5 \times 1 = 25.5, x_7 = 26.5$

d) Median $= \frac{25.5+26.5}{2} = 26$

1

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Self Evaluation

Mathematics Test 8

1 hour

25 scores

1) What is the slope of x axis ?

(a) 0 (b) 1 (c) -1 (d) $\frac{1}{2}$

1 score

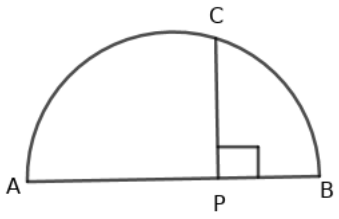
2) First term of an arithmetic sequence is $\frac{1}{2}$ and common difference $\frac{1}{6}$ then

a) What is the algebraic form of the sequence ?

b) At what position 2occurs in the sequence .

2 score

3) AB is the diametre of the semicircle. P is a point on AB , AB is perpendicular to PC $PC = 6$cm , $PB = 3$cm then



a) What is the radius of the circle ?

b) What is the area of the sqaure with side PC?

2 score

4) Consider the sequence of even numbers $2, 4, 6, 8 \cdots$

a) Write the algebraic form of the sequence .

b) How many terms beginning from first term in the order makes the sum 210

3 score

5) Consider the following angle measures.

$$\sin 42^\circ, \cos 78^\circ, \sin 70^\circ, \cos 14^\circ$$

a) Rewrite all these into equivalent $\sin$ measures.

b) Which is the smallest and largest among them ?

c) Write these in the ascending order.

3 score

6) A line passes through $(3,4),(6,8)$

a) What is the slope of this line?

b) Is this line passes through the origin?

c) Write the coordinates of another point on this line .

4 score

7) A circular disc of central angle $120°, 240°$ is cut into sectors .Thes sectors are rolled into cones.

a) Which measure is common in both cones?

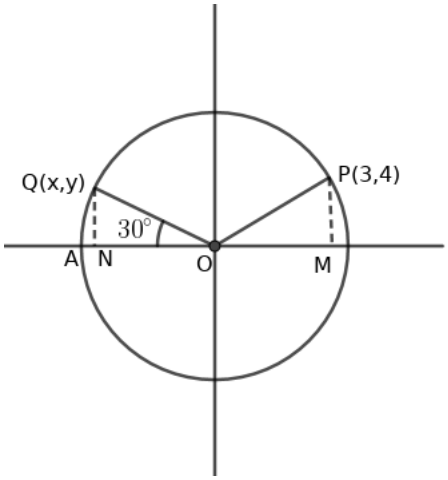
b) What is the radius of the small cone ?

c) What is the radius of the bih cone ?

d) What is the relation between the radii of cones and radius of the circular plate ?

5 score

8) $P(3,4)$ is a point on the circle with centre at the origin.
$Q(x,y)$ is another point on the circle such that $\angle AOQ = 30°$



a) What is the radius of the circle?

b) What are the points at which the circle cut the axes?

c) Write the coordinates of Q

d) Write the coordinates of another point on the circle .

5 score

SJ Self Evaluation Series

Answers

1) 0

2) a) $x_n = dn + (f - d) = \frac{1}{6}n + (\frac{1}{2}) - \frac{1}{6}$
$x_n = \frac{1}{6}n + \frac{2}{6} = \frac{n+2}{6}$

b) $n = 10$ആയാൽ $x_{10} = \frac{10+2}{6} = 2$
Tenth term is 2

3) a) $PA \times PB = PC^2$
$PA \times 3 = 6^2, PA = \frac{36}{3} = 12$
$AB = 12 + 3 = 15$.Radius $= \frac{15}{2} = 7.5$ cm

b) Area $= PC^2 = 12^2 = 144$sq.cm

4) a) $x_n = 2n$

b) $n(n+1) = 210, n^2 + n = 210$
$n^2 + n + \frac{1}{4} = 210 + \frac{1}{4}$
$(n + \frac{1}{2})^2 = \frac{841}{4}$
$n + \frac{1}{2} = \sqrt{\frac{841}{4}} = \frac{29}{2}$
$n = \frac{29}{2} - \frac{1}{2} = 14$
Sum of first 14 even numbers is 210

5) a) $\sin 42^\circ = \sin 42^\circ$
$\cos 78^\circ = \sin(90 - 78) = \sin 12^\circ$
$\sin 70^\circ = \sin 70^\circ$
$\cos 14^\circ = \sin(90 - 14) = \sin 76^\circ$

b) Smallest is $\sin 12^\circ$
Largest is $\sin 76^\circ$.
Smallest $\cos 78^\circ$,Largest $\cos 14^\circ$

c) $\sin 12^\circ, \sin 42^\circ, \sin 70^\circ, \sin 76^\circ$
$\cos 78^\circ < \sin 42^\circ < \sin 70^\circ < \cos 14^\circ$

6) a) Slope $\frac{y_2 - y_1}{x_2 - x_1} = \frac{8-4}{6-3} = \frac{4}{3}$

b) Origin $(0, 0)$. taking $(0, 0)$ and $(3, 4)$, $= \frac{4-0}{3-0} = \frac{4}{3}$
Origin comes in this line

c) $(-3, -4)$

7) a) Slope $= 12$ cm

b) $lx = 360r_1 \to 12 \times 120 = 360 \times r_1$
$r_1 = \frac{12 \times 120}{360} = 4$cm

c) $lx = 360r_2 \to 12 \times 240 = 360 \times r_2$
$r_2 = \frac{12 \times 240}{360} = 8$cm

d) $r_1 + r_2 = 12$.Sum of the radii is the radius of the circle.

8) a) $OP = \sqrt{OM^2 + PM^2} = \sqrt{3^2 + 4^2} = 5$

b) $(5, 0), (0, 5), (-5, 0), (0, -5)$

c) $\triangle ONQ$ is a $30^\circ - 60^\circ - 90^\circ$ triangle
$OQ = 5, \therefore QN = \frac{5}{2}, ON = \frac{5}{2}\sqrt{3}$
$Q(-\frac{5}{2}\sqrt{3}, \frac{5}{2})$

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

[1]

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Self Evaluation

Mathematics Test 9

1 hour

25 scores

1) If $\sin A = \cos B$ then what is $A + B$?

(a) 100° (b) 90° (c) 180° (d) 45°

1 score

2) Consider the sequence $p(x) = x^2 - 7x + 12$

a) Write $p(x)$ as the product of two first degree factors.

b) Solve the equation $p(x) = 0$

2 score

3) The atmospheric temperature of seven days in a city are given below

$$26^\circ C, 28^\circ C, 25^\circ C, 30^\circ C, 27^\circ C, 26^\circ C, 25^\circ C$$

c) Calculate median temperature

d) How many days are there above median temperature? How many days are there below median temperature.

2 score

4) Fifth term of an arithmetic sequence is 10 and its tenth term is 5

a) What is the common difference?

b) What is the fifteenth term?

d) What is the product of first 15 terms?

3 score

5) Consider the numbers $A(2, 0), B(-6, -2), C(-4, -4), D(4, -2)$

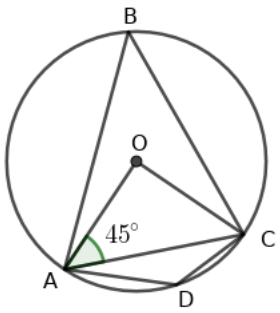
a) What is the slope of AB and CD?

b) What is the slope of AD and BC

c) Is $ABCD$ a parallelogram ?

3 score

6) O is the center of a circle. $\angle AOC = 45^\circ$ then



a) What kind of triangle is OAC?

b) What is the measure of $\angle ABC$

c) What is the measure of $\angle ADC$

d) If the radius of the circle is 6cm then what is the length of the chord AC?

4 score

7) Numbers $1, 2, 3, 4$ are written in small peper pieces and put in a box. Numbers $1, 2, 3$are writetn in small paper pieces and put in another box . One is taken from each box without looking into the box.

a) How many pairs are possible?

b) What is the probability of getting the product of the numbers in the pair an odd number?

c) What is the probability of getting the product of the numbers in the pair an even number?

5 score

8) A two digit number is 4 times the sum of its digits.The number is 2 times the product of the digits.

a) If the digit in the one's place is y and digit in tens place is x then write the number

b) Make a second degree equation using the given condition.

c) Find the number.

5 score

SJ Self Evaluation Series

Answers

1) $\star\ \sin A = \cos B \to \sin A = \sin(90 - B)$
$\star\ A = 90 - B \to A + B = 90°$

2) a) $x^2 - 7x + 12 = (x - a)(x - b) = x^2 - (a + b)x + ab$
b) $a + b = 7, ab = 12 \to a = 4, b = 3$
$x^2 - 7x + 12 = (x - 4)(x - 3)$

3) a) $25°C, 25°C, 26°C, 26°C, 27°C, 28°C, 30°C$
Middle number in the ascending order is 26. median temperature $= 26°C$
b) There are 3 days above median temperature $26°C$. There are 2 days below median temperature

4) a) $5d = 5 - 10 = -5, d = -1$

b) $x_1 = x_5 - 4 \times d = 10 -^{-} 1 \times 4 = 14$

c) $x_{15} = f + 14d = 14 + 14 \times (-1) = 14 - 14 = 0$

d) 0

5) a) Slope of AB $\frac{-2-0}{-6-2} = \frac{-2}{-8} = \frac{1}{4}$
Slope of $CD = \frac{-2-^{-}4}{4-^{-}4} = \frac{2}{8} = \frac{1}{4}$
Line AB is parallel to CD

b) Slope of $AD = \frac{-2-0}{4-2} = \frac{-2}{2} = -1$
Slope of BC is $\frac{-4-^{-}2}{-4-^{-}6} = \frac{-2}{2} = -1$
Line AD is parallel to BC.

c) Since opposite sides are parallel $ABCD$ is a parallelogram .

6) a) $OA = OC, \angle OAC = \angle OCA = 45°, \angle AOC = 90°$. $\triangle OAC$ is an isosceles right triangle

b) $\angle ABC = \frac{1}{2}AOC = 45°$

c) $\angle ADC = 180 - 45 = 135°$

d) $AC = \sqrt{6^2 + 6^2} = 6\sqrt{2}$cm

7) a) Number of pairs $4 \times 3 = 12$
$(1,1), (1,2), (1,3)$
$(2,1), (2,2), (2,3)$
$(3,1), (3,2), (3,3)$
$(4,1), (4,2), (4,3)$

b) Pairs giving odd number product $(1,1)(1,3), (3,1)(3,3)$
Probability $\frac{4}{12} = \frac{1}{3}$

c) Probability of not giving odd is $= 1 - \frac{1}{3} = \frac{2}{3}$

8) a) Digit in the tens place x, Digit in one's place y
Number $10x + y$

$$10x + y = 4(x + y) \quad (1)$$

$$10x + y = 3xy \quad (2)$$

b) $10x + y = 4x + 4y, 6x = 3y, y = 2x$
$10x + y = 3xy \rightarrow 10x + 2x = 3x \times 2x$
$12x = 6x^2$

c) $x = 0, x = 2$. Tens place cannot be 0. Tens place $= 2$, One's place $2x = 4$
Number $= 24$

[1]

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Self Evaluation

Mathematics Test 10

1 hour

25 scores

1) In the polynomial $p(x) = ax^3 + bx^2 + cx + d$ if $a + b + c + d = 0$then what is the factor of $p(x)$

(a) $x + 1$ (b) $x - 1$ (c) $x + 2$ (d) $x - 2$

1 score

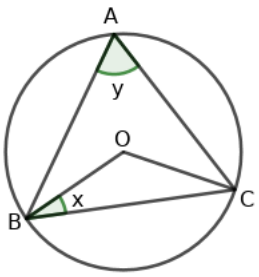
2) When the angles of a right triangles form an arithmetic sequence if arranged in an order.

a) Which angle comes in the middle?

b) Write the angles of the triangle

2 score

3) In triangle ABC, the centre of the circumcircle is O.
If $\angle BAC = y, \angle OBC = x$ then



a) What is the measure of $\angle BCO$?

b) Prove that $x + y = 90^\circ$

2 score

4) $OABC$സാമാന്തരീകമാണ്. $O(0,0), A(5,0), B(7,4)$ആയാൽ

a) Draw a rough diagram

b) Write the coordinates of C

c) Calculate the area of the parallelogram.

3 score

5) Length of a rectangle is 8 more than its breadth .

a) If breadth is x then what is length

b) If the area is 240sq.cm form a second degree equation.

c) Find the length and breadth

3 score

6) Base perimetre of a cone is 20πcm ,slant height 18cm . It is made by rolling a sector

a) What is the radius of the sector?

b) What is the radius of the cone?

c) What is the central angle of the sector?

d) What is the curved surface area of the cone?

4 score

1) Consumption of electricity in an area is given below

Use of Electricity in Unit	Number of houses
80 - 90	3
90 - 100	6
100 -110	7
110- 120	10
120 – 130	9
130 - 140	5

a) Which house comes in the middle if the houses area arranged in the ascending order of consumption

b) What is the consumption of 17 th house.

c) Calculate the consumption of the houses comes in the middle?

d) Calculate the median

5 score

8) Triangle ABC is an equilateral triangle . If $A(1,1), B(7,1)$then

a) What is the length of a side?

b) What is the mid point of AB

c) What is the altitude of the triangle?

d) Write the coordinates of C

e) Write one point c

5 score

SJ Self Evaluation Series

Answers

1) $\star$ $a+b+c+d=0 \rightarrow p(1)=0$.

$\star$ $x-1$is a factor

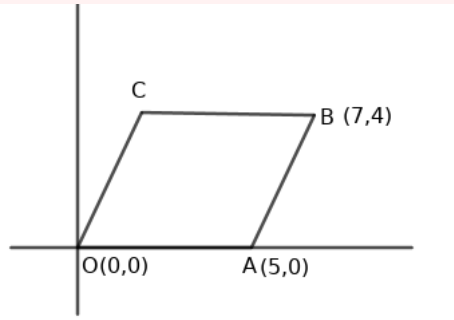
2) a) $a-d, a, a+d$ are the terms $a-d+a+a+d=180, a=60$
$a+d=90, 60+d=90, d=30$
Middle angle is 60°

b) $30^\circ, 60^\circ, 60^\circ$

3) a) Since $OB=OC$ then the sides opposite to equal sides of triangle OBC are equal.
$\angle BCO = x$.

b) $\angle BOC = 2 \times \angle BAC$
$180-2x=2y, 2x+2y=180, x+y=90^\circ$

4) a) Look at the picture



b) OA is parallel to BC. So the differnce between the x coordinates of O, A is equal to the difference between the x coordinates of B, C. This is true in the case of y coordinates
$C(7-5, 4) = C(2, 4)$

c) Area $= 5 \times 4 = 20$

5) a) Length $= x+8$

b) $x(x+8)=240, x^2+8x=240$

c) Add $(\frac{8}{2})^2$ on both sides .
$x^2+8x+16=240+16$
$(x+4)^2=256, x+4=\sqrt{256}=16, x=16-4=12$
breadth 12 cm ,length $12+8=20$cm

6) a) 18cm

b) $2\pi r = 20\pi, r = 10$cm

c) $lx = 360r \rightarrow 18 \times x = 360 \times 10, x = \frac{360 \times 10}{18} = 200^\circ$

d) Lateral suface area $\pi rl = 180\pi$sq.cm

7) a) Look at the table

Use of Electricity in Unit	Number of houses
Below 90	3
Below 100	9
Below 110	16
Below 120	26
Below 130	35
Upto 140	40

Number of houses 40. 20 th and 21 st comes in the middle.It belongs to $110-120$

b) There are 10 houses . 10unit is divided equally among 10 houses. Each share is 1.
Use of 17th house is $= 110 + \frac{1}{2} = 110 + 0.5 = 110.5$

c) 20 th 21st comes in the middl. First term 110.5, common difference 1. Fourt and fifth terms comes in the middle.
$x_4 = 110.5 + 3 \times 1 = 113.5, x_5 = 114.5$

d) Median $= \frac{113.5+114.5}{2} = 114$

8) a) $AB = \mid 7 - 1 \mid = 6$

b) $CD$is the height . $D(4, 1)$

c) $CD = 3\sqrt{3}$

d) $C(4, 1 + 3\sqrt{3})$

e) $C(4, -(3\sqrt{3} - 1))$
$C(4, 1 - 3\sqrt{3})$

[1]

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Self Evaluation

Mathematics Test 10

1 hour

25 scores

1) A sector is rolled into a cone. The slant height of the cone is two times the radius of the cone.What is the central angle of the sector?

(a) $90°$ (b) $100°$ (c) $150°$ (d) $180°$

1 score

2) The marks obtained by some students in a class are given below

$$14, 17, 11, 19, 15, 17, 13, 10, 14, 18$$

a) Which mark comes in the middle in the ascending order.

b) Calculate the median

2 score

3) Consider the polynomial $p(x) = x^3 + 4x^2 + x - 7$

a) Is $x - 1$ a factor of this polynomial

b) If not what should be subtracted from $p(x)$ to get $q(x)$ in which $x - 1$ a factor

2 score

4) $A(1, -2), B(x, 4)$ are the points on a line of slope 3

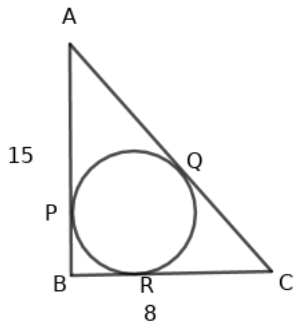
a) What is x?

b) Write the coodinates of one more point on this line ?

c) At what point the line cut x axis ?

3 score

5) In the figure $\angle B = 90°$,$AB = 15$cm , $BC = 8$ cm



a) Draw a rough diagram and mark the centre O
Suggest a suitable name to $PORB$

b) If $PB = x$ then find AP, AQ, CR, CQ

c) What is the radius of the circle.

3 score

3) Line passing through x axis passing through $(0, 6)$.Line parallel to y axis passing through $(8, 0)$.

a) Write the coodinates of the point of intersection$P$ of the lines

b) What is the distance from origin to P

c) Write the coordintes of another point on this line .

4 score

7) A boy observes the top pf a building of height 30metre some distance away from the foot of the tower at the angle of elevation .Moving some distance towards the building the angle of elevation becomes $60°$

a) Draw a rough diagram

b) What is the distance from the foot of the tower to the second point of observation

c) What is the distance between the two points of observation.

d) What is the distance from the foot of the tower to the second point of observation.

5 score

8) Algebraic form of the sum of first n terms of a sequence is $n^2 + n$.

a) Write the sequence .

b) Write the algebraic form of this sequence .

c) Can the sum of some terms of this sequence 2021?

d) How many terms are below 100

e) Find the sum of all terms below 100

5 score

SJ Self Evaluation Series

Answers

1) ⋆ $lx = 360r \to 2r \times x = 360 \times r$
⋆ $x = 180°$

2) a) marks in the ascending order $10, 11, 13, 14, 14, 15, 17, 17, 18, 19$
$n = 10$ (Even number). 5th and 6th cmes in the middle. These are $14, 15$.

b) Median $= \frac{14+15}{2} = 14.5$

3) a) $p(1) = 1^2 + 4 \times 1^2 + 1 - 7 = -1$
$p(1) \neq 0$. $x - 1$ is not a factor

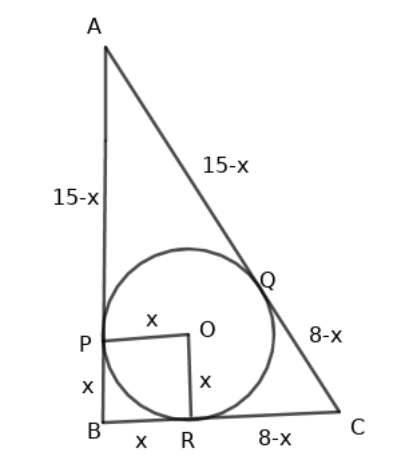
b) Number to be subtracted is -1

4) a) Slope : $\frac{y_2-y_1}{x_2-x_1}=3$, $\frac{4-^-2}{x-1}=3$, $\frac{6}{x-1}=3, 3x-3=6, 3x=9, x=3$, $B(3,4)$

b) slope 3 . Another point is $C(3+1,4+3)\rightarrow C(4,7)$

c) y coordinate of the point which cut x axis is 0. Point is $P(x,0), A(1,-2)$
$\frac{-2-0}{1-x}=3, x=\frac{5}{3}$,Point is $P(\frac{5}{3},0)$

5) a) Picture



$PORB$is a square

b) $AP=15-x, AQ=15-x, CR=8-x, CQ=8-x$

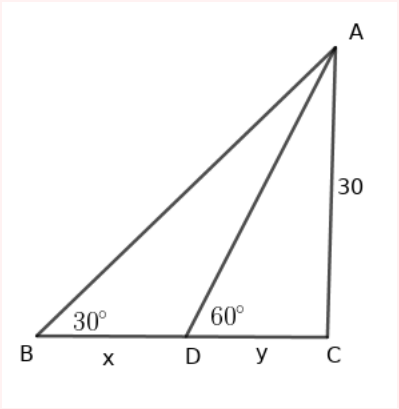
c) Hypotenuse $AC=\sqrt{15^2+8^2}=17$
$15-x+8-x=17, 23-17=2x, 2x=6, x=3$
ആരം 3cm

6) a) $P(8,6)$

b) $OP=\sqrt{8^2+6^2}=10$

c) $Q(-8,-6)$

7) a) Picture



b) $BD=x, AD=y$
Triangle BDC is a $30-60-90$triangle . $x=\frac{30}{\sqrt{3}}=10\sqrt{3}$

c) $x+y=30\sqrt{3}, y=30\sqrt{3}-10\sqrt{3}=20\sqrt{3}$മീറ്റർ

d) $x+y=30\sqrt{3}$

8) a) $x_1=1^2+1=2, x_1+x_2=2^2+2=6$
$x_2=6-2=4, d=x_2-x_1=4-2=2$
Sequence :$2,4,6\cdots$

b) $x_n = 2n$

c) All terms are even numbers . Sum of even numbers cannot be odd number. 2021 cannot be the sum

d) $2n = 98, n = 49$There are 49 terms below 100

e) Sum $= 2(1 + 2 + 3 + \cdots 49) = 2 \times (49 + 1) \times \frac{49}{2} = 49 \times 50 = 2450$

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scale=1

Self Evaluation

Mathematics Test 10

1 hour

25 scores

1) The length of tangent from a point 13 cm away from the centre of a circle is 12cm . What is the radius of the circle?

(a) 5cm (b) 10cm (c) 15cm (d) 18cm

1 score

2) Algebraic form of an arithmetic sequence is $3n+5$

a) What is its 10 th term?

b) What should be added to its 10 th term to get 20 th term?

2 score

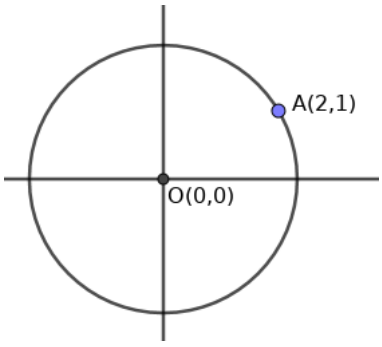
3) Consider the sequence $2, 4, 6, 8, \cdots$

a) What is the mean of first 20 terms?

b) How many terms from the beginning makes its mean 31?

2 score

4) $(1, 2)$ is a point on the circle with centre at the origin.



a) What is the radius of the circle?

b) What are the points where the circle cut the axes?

c) Write the coordinates of one more points on this circle.

3 score

5) Consider the polynomial $p(x)= ax^2 - 2bx + c$

a) If $x-1$ is a factor prove that a, b, c are in an arithmetic sequence ?

b) Write two polynomials having a, b, c in an arithmetic sequence .

c) x^2-1 is a factor of $p(x)$ then what is $a+c$?

3 score

6) The points $A_1, A_2, A_3 \cdots A_n$ are marked in a circle.These are joined pairwise to get chords

a) How many chords can be drawn from a point?

b) What is the total number of chords?

c) How many points are needed to get 35 chords?

4 score

7) A sector of central angle 288° and radius 25cm is taken from a circulat sheet .

a) What is the radius of the cone?

b) What is the height of the cone ?

c) Find the lateral surface area of the cone?

d) What is the radius of the cone made by rolling the remaining part?

5 score

3) The table given below shows the daily wages of workers in a factory .

ദിവസക്കൂലി	ജോലിക്കാരുടെ എണ്ണം
400-500	6
500-600	7
600-700	10
700-800	9
800-900	5
900-1000	4

a) Prepare a table for calculating the median.

b) In which calss 21 st wage comes?

c) What are the assumpptions for calculating median.

d) What is the wage of 14 th worker in the arrangement?

e) Calculate median

5 score

SJ Self Evaluation Series

Answers

1) ⋆ Tangent ,radius and distance from centre to the exterior point makes a right triangle.

⋆ $r=\sqrt{13^2-12^2}=5$cm

2) a) $x_{10} = 3 \times 10 + 2 = 32$

b) $10 \times 3 = 30$

3) Sum of first n even numbers is $n(n+1)$

a) Mean $= \frac{20(20+1)}{20} = 21$

b) 30

4) a) Radius $r = \sqrt{1^2 + 2^2} = \sqrt{5}$

b) $(\sqrt{5}, 0), (0, \sqrt{5}), (-\sqrt{5}, 0), (0, -\sqrt{5})$

c) $(-1, 2), (-1, -2)$

5) a) If $x - 1$ is a factor $p(1) = 0$.
$a \times 1^2 - 2b \times 1 + c = 0, a - 2b + c = 0$
$a + c = 2b, a + c = b + b \rightarrow b - a = c - b \rightarrow a, b, c$are in an arithmetic sequence .

b) $a = 4, b = 3, c = 2$ polynomaial is $4x^2 - 6x + 2$.

c) $x^2 - 1 = (x-1)(x+1), x - 1, x + 1$ are factors .$p(1) = 0 \rightarrow a - 2b + c = 0$
$p(-1) = 0 \rightarrow a + 2b + c = 0$
$2a + 2c = 0, a + c = 0$

6) a) $n - 3$

b) $\frac{n(n-3)}{2}$

c) $\frac{n(n-3)}{2} = 35, n(n-3) = 70, n^2 - 3n = 70, n^2 - 3n + \frac{9}{4} = 70 + \frac{9}{4}$
$(n - \frac{3}{2})^2 = \frac{289}{4}$
$n - \frac{3}{2} = \frac{17}{2}, n = 10$

7) a) $lx = 360r \rightarrow 288 \times 25 = 360 \times r, r = \frac{288 \times 25}{360} = 20$ cm

b) $l^2 = h^2 + r^2$, $25^2 = h^2 + 20^2 \rightarrow h^2 = 625 - 400 = 225, h = \sqrt{225} = 15$cm

c) Curved surface area $\pi rl = \pi \times 20 \times 25 = 500\pi$ sq.cm

d) Radius of the remainig part $25 - 20 = 5$cm

8) a) Table

Wages	No of Workers
Below 500	6
Below 600	13
Below 700	23
Below 800	32
Below 900	37
Below 1000	41

b) $n = 41$, $\frac{41+1}{2}$ th wage comes in the middle. It is 21st wage .It belongs to $600 - 700$.

c) Wages in the median class is divided equally among the workers of the class.It makes an arithmetic sequence .

d) There are 10 workers in the median class. First wage is $= 600 + \frac{10}{2} = 605$

d) In the sequence , $f = 605, d = 10$. $x_8 = f + 7d = 605 + 7 \times 10 = 605 + 70 = 675$
median 675

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Self Evaluation

Mathematics Test 10

1 hour

25 scores

1) What is the altitude to the side BC of triangle ABC in which $A(4,10), B(1,5)$ and $C(7,5)$

(a) 5 (b) 6 (c) 10 (d) 11

1 score

2) A numerical sequence is obtained by adding 3 to the multiples of 7 in the order.

a) Write the algebraic form of the sequence.

b) Which is the smallest three digit term of this sequence?

2 score

3) The top of a tree of height $60\sqrt{3}$ metre is observed from a point 60m away from its foot .

a) Draw a rough diagram

b) What is the angle of elevation.

2 score

4) A square pyramid has base area 144 sq.cm and height 8 cm

a) What is the base edge?

b) What is the slant height?

c) Calculate the lateral surface area of the pyramid.

3 score

5) The sides of four squares are four consecutive natural numbers. The sum of the area of the squares is 174sq.cm

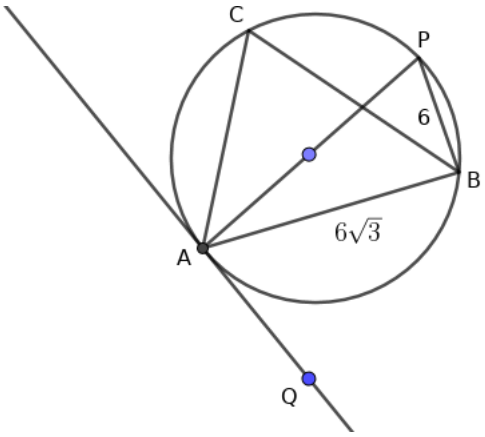
a) If the side of the small square is x then write the sides of other three squares.

b) Form a second degree using the given conditions.

c) Find the sides of the squares.

3 score

6) In the figure AP is the diametre of the circle.$AB = 6\sqrt{3}$cm $PB = 6$ cm



a) What is the radius of the circle?

b) What are the angles of $\triangle APB$?

c) What is the measure of $\angle ACB$?

d) What is the measure of $\angle BAQ$?

4 score

7) Three lines $x = 3, y = 4, 4x + 3y = 36$encloses a polygon.

a) Suggest a suitable name to this polygon.

b) Find the vertices of this polygon.

c) Calculate the area

d) What is the radius of the circle passing through the vertices of the polygon.

e) What are the coordinates of the circumcentre.

8) Consider the polynomial $p(x) = x^2 + 6x + k$

a) If $k = 0$then what are the first degree factors of $p(x)$?

b) What is the value of k to get two equal first degree factors ?

c) What are the values of k not for occuring a first degree factor to this polynomial?

d) If $k = 8$ what are the first degree factors of $p(x)$?

5 score

SJ Self Evaluation Series

Answers

1) ⋆ BC is parallel to $x$axis

⋆ Height $\mid 10 - 5 \mid = 5$

2) $10, 17, 24 \cdots$

This is an arithemtic sequence

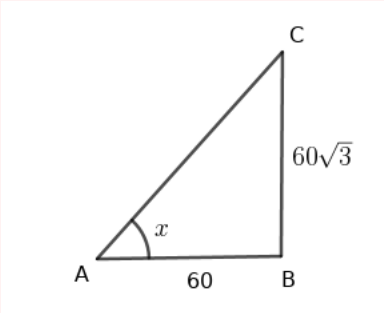
a) $x_n = dn + (f - d) = 7n + (10 - 7) = 7n + 3$

b) $7n + 3 > 99 \rightarrow 7n > 99 - 3 = 96, n > \frac{96}{7} = 13.7$

$n = 14, x_{14} = 7 \times 14 + 3 = 98 + 3 = 101$

First three digit term is 101

3) a) Picture



b) $AC = 120, AB = 60, BC = 60\sqrt{3}$. This is a $30° - 60° - 90°$ right triangle .
$\angle BAC = 60°$

4) a) $a^2 = 144, a = 12$ cm

b) $l = \sqrt{8^2 + 6^2} = 10$ cm

c) Lateral surface area $= 2al = 2 \times 12 \times 10 = 240$sq.cm

5) a) $x + 1, x + 2, x + 3$

b) $x^2 + (x + 1)^2 + (x + 2)^2 + (x + 3)^2 = 174$
$x^2 + (x^2 + 2x + 1) + (x^2 + 4x + 4) + (x^2 + 6x + 9) = 174$
$4x^2 + 12x = 160, x^2 + 3x = 40$

c) $x = 5, x + 1 = 6, x + 2 = 7, x + 3 = 8$

6) a) $AP = \sqrt{(6\sqrt{3})^2 + 6^2} = 12$. Radius of the circle 6 cm

b) AP is the diametre , $\angle B = 90°$. Sides of $\triangle APB$ are in the ratio $1 : \sqrt{3} : 2$. This is a $30° - 60° - 90°$ triangle .
$\angle A = 30°, \angle P = 60°, \angle B = 90°$

c) $\angle ACB = 60°$ (angle in the same arc)

d) $60°$

7) a) Line $x = 3$ is parallel to y axis passing through $(3, 0)$. $y = 4$ is a line parallel to x axis passing through $(0, 4)$. $4x + 3y = 36$ cut both these lines.This is a right triangle

b) $A(3, 4)$ is the vertex at which $90°$ angle is formed .
Lines $x = 3$, $4x + 3y = 36$ intersect at B.
$4 \times 3 + 3y = 36, 3y = 24, y = 8$, $B(3, 8)$.
$y = 4$, $4x + 3y = 36$ intersect at C.
$4 \times x + 3 \times 4 = 36, 4x = 24, x = 6$, $C(6, 4)$.

c) $AB = \mid 8 - 4 \mid = 4$, $AC = \mid 6 - 3 \mid = 3$
area $= \frac{1}{2} \times 4 \times 3 = 6$sq.cm

d) Hypotenuse $\sqrt{3^2 + 4^2} = 5$. Radius of the circumcircle 2.5

e) It is $(\frac{3+6}{2}, \frac{8+4}{2}) = (\frac{9}{2}, 6)$

8) a) If $k = 0$ then $p(x) = x^2 + 6x \to x(x + 6)$, factors are $x, x + 6$

b) $x^2 + 6x + k = x^2 + 2 \times 3 \times x + 3^2$ can be written as $(x + 3)^2$. For this $k = 9$. First degree factors are $x + 3, x + 3$.

c) $x^2 + 6x + k = (x - a)(x - b), a + b = -6, ab = k$
$(a - b)^2 = (a + b)^2 - 4ab \to (a - b)^2 = (-6)^2 - 4 \times k$
$(a - b)^2 = 36 - 4k$.
$k > 9$
$(a - b)^2$ cannot be a negative number .For this $k > 9$.

d) $k = 8$ആയാൽ$p(x) = x^2 + 6x + 8 = x^2 + 4x + 2x + 8 = x(x + 4) + 2(x + 4) = (x + 4)(x + 2)$
First degree factors are $(x + 4), (x + 2)$

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Self Evaluation

Mathematics Test 14

1 hour

25 scores

1) The sum of a number and its square is 0. What is the number?

(a) -2 (b) 1 (c) 2 (d) -1

1 score

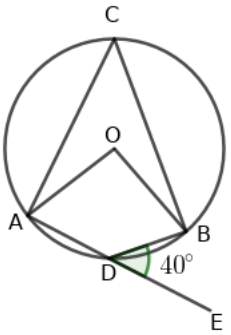
2) Algebraic form of an arithmetic sequence is $4n+3$.

a) What is the common difference ?

b) Can the difference between any two terms of this sequence 176

2 score

3) In the figure ,$BDE = 40°$then

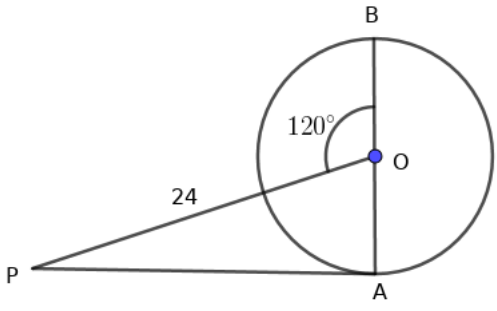


a) What is the measure of ACB?

b) What is the measure of AOB?

2 score

4) In the figure $\angle POB = 120°, OP = 24$cm , AB is the diametre of the circle .



a) What are the angles of $\triangle POA$

b) What is the diametre of the circle?

c) What is the length of the tangent from $P$to the circle?

3 score

5) Consider the points $A(1,-1), B(5,2), C(9,5)$

a) Find the lengths AB, BC and AC

b) Check whether these points are on a line or not.

c) What is the mid point of AC

3 score

6) $10A$യിൽ 30boys and 20girls in ten A. 15 boys 25girls in ten B.
One is selected from both the classes.

a) How many ways this selection can be done.

b) What is the probability of getting both are boys ?

c) What is the probability of getting both are girls?

4 score

7) A cone of maximum size is carved from a wooden block in the shape of a square prism with base edge 10cm and height 12cm .

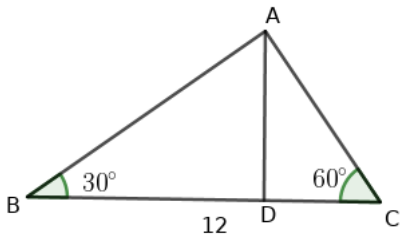
a) What is the radius of the cone?

b) What is the slant height?

c) Calculate the curved surface area of the cone ?

d) Calculate the total surface area .

8) In $\triangle ABC$, $\angle B = 30^\circ, \angle C = 60^\circ$, $BD = 12$cm



a) BC is perpendicular to DA, If $DB = x$ then what is DC?

b) From $\triangle BDA, \triangle CDA$ make two equations connecting the sides .

c) Find x

d) What is the perpendicular from A to BC

e) Find the area of $\triangle ABC$

SJ Self Evaluation Series

Answers

1) ⋆ $(-1)^2 + (-1) = 0$

⋆ -1

2) a) 4

b) 176 is a multiple of 4 . So 176 can be the difference between the terms .

3) a) $\angle ADB = 180 - 40 = 140°$

b) $\angle ACB = 180 - 140 = 40°$

c) $\angle AOB = 2 \times 40 = 80°$

4) a) $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$,$AB = \sqrt{(5-1)^2 + (2 - ^- 1)^2} = \sqrt{16+9} = 5$
$BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$,$BC = \sqrt{(9-5)^2 + (5-2)^2} = \sqrt{16+9} = 5$
$AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$,$AC = \sqrt{(9-1)^2 + (5 - ^- 1)^2} = \sqrt{64+36} = 10$

b) $AB + BC = 10, AC = 10 \rightarrow AB + BC = AC$
A, B, C are on a line

c) $AB = 5, BC = 5$, B is the mid point of AC.
$B(5, 2)$

5) a) Number of pairs $(20 + 30) \times (15 + 25) = 50 \times 40 = 2000$

b) Probability of getting both boys $= \frac{30 \times 15}{2000} = \frac{450}{2000} = \frac{9}{40}$

c) Probability of getting both boys girls $= \frac{20 \times 25}{2000} = \frac{500}{2000} = \frac{1}{4}$

6) a) 5cm

b) $h = 12$cm , $r = 5$cm
$l = \sqrt{5^2 + 12^2} = 13$ cm

c) Lateral surface area $= \pi rl = 65\pi$ sq.cm

d) Total surface area =Base area + lateral surface area
$= 25\pi + 65\pi = 90\pi$sq.cm

7) a) 5cm

b) $h = 12$cm , $r = 5$cm
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c) Lateral surface area $= \pi rl = 65\pi$sq.cm

d) total surface area = base area + lateral surface area
$= 25\pi + 65\pi = 90\pi$sq.cm

8) a) $CD = 12 - x$

b) If $AD = h$
$\frac{h}{x} = \tan 30 = \frac{1}{\sqrt{3}}, h = \frac{x}{\sqrt{3}}$
$\frac{h}{12-x} = \tan 60 = \sqrt{3}, h = \sqrt{3}(12 - x)$

c) $\frac{x}{\sqrt{3}} = \sqrt{3} \times (12 - x)$
$x = \sqrt{3} \times \sqrt{3} \times (12 - x)$
$x = 3(12 - x), 4x = 36, x = 9$

d) $h = \frac{x}{\sqrt{3}} = \frac{9}{\sqrt{3}} = 3\sqrt{3}$cm

e) Area $= \frac{1}{2} \times 12 \times 3\sqrt{3} = 18\sqrt{3}$sq.cm

5 score

1

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scale=1

Self Evaluation

Mathematics Test 14

1 hour

25 scores

1) What is the distance from the origin to the point of intersection of the lines $x = 4$, $y = 3$

(a) 5 (b) 3 (c) 2 (d) 7

1 score

2) Consider the arithmetic sequence $7, 10, 13 \cdots$

a) How many numbers are there in the sequence below 100?

b What is the median of these numbers ?

2 score

3) Total surface area of a solid sphere is 100 sq.cm . Two hemispheres are made from this sphere .

a) What is the curved surface area of the hemisphere?

b) What is the total surface area of the hemisphere ?

2 score

4) Gifts are exchanged among a group of children.There are 132 gifts in total.

a) If there is n children in the group then how many gifts a child got ?

b) Form a second degree equation.

c) Calculate the number of children in the group

3 score

5) Manju has three coloured ear rings and chains, green, red and blue. She wear these ornaments in different ways .

a) How many ways she can ware the ornaments?

b) What is the probability of wearing ornaments of same colour

c) What is the probability of wearing ornaments of different colours

3 score

6) Consider the polynomial $p(x) = x^3 + 4x^2 + x - 6$

a) Find $p(1)$. Is $x - 1$ a factor of $p(x)$?

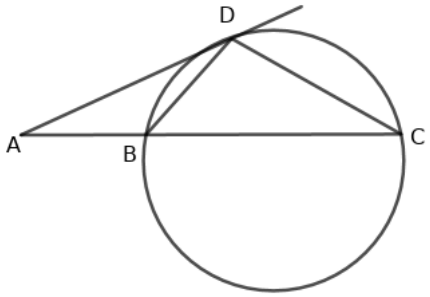
b) What is the quotient when $p(x)$ is divided by $x - 1$?

c) Write the quotient as the product of two first degree polynomials.

d) Find the solution of the equation $p(x) = 0$

4 score

7) In the figure $AB = BD$, the line AD touches the circle at A



a) What is the relation between the lengths AB, AC, AD

b) Establish the relation $AB \times AC = CD^2$

c) What is the property of $\triangle ACD$

d) If $\angle BAD = 30°$, The perpendicular from D to BC is 12cm then what is the langth of AD.

8) The first term of an arithmetic sequence is 3 and common difference 2.

a) Write the sequence .

b) How many times common difference to be added to its first term to get 10 th term.

c) What is its tenth term?

d) What is its 101 st term of the sequence?

e) Is 100 a term of the sequence ?

5 score

SJ Self Evaluation Series

Answers

1) ⋆ Distance $= \sqrt{3^2 + 4^2} = 5$

⋆ 5

2) a) $3n + 4 < 100 \to 3n < 96, n < 32$
$n = 31$. There are 31 terms below 100

b) 16 th term is the middle term . $x_{16} = 3 \times 16 + 4 = 48 + 4 = 52$

3) a) $4\pi r^2 = 100 \to 2\pi r^2 = 50$ sq.cm

b) $\pi r^2 = 25 \to 3\pi r^2 = 75$sq.cm

4) a) $n - 1$

b) $n(n-1) = 132$
$n^2 - n - 132 = 0$

c) $n^2 - n = 132, n^2 - n + \frac{1}{4} = 132 + \frac{1}{4}, (n - \frac{1}{2})^2 = \frac{529}{4}, (n - \frac{1}{2}) = \frac{23}{2}, n = 12$

5) a) Number of possible pairs $3 \times 3 = 9$
(green, green),(green ,red),(green,blue)
(blue , green),(blue ,red),(blue,blue)
(red, green),(red ,red),(red,blue)

b) (green,green),(red ,red),(blue,blue)
Probability= $\frac{3}{9} = \frac{1}{3}$

c) Probability of wearing different colours $1 - \frac{1}{3} = \frac{2}{3}$

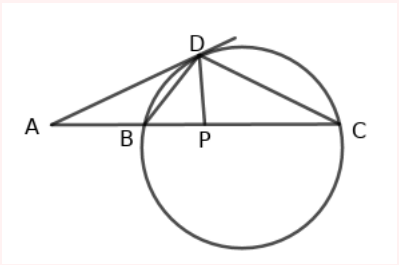
6) a) $p(1) = 1^3 + 4 \times 1^2 + 1 - 6 = 1 + 4 + 1 - 6 = 0$
Since $p(1) = 0$ $(x - 1)$ is a factor .

b) Quotient is $ax^2 + bx + c$
$.x^3 + 4x^2 + x - 6 = (x - 1)(ax^2 + bx + c)$
$x^3+4x^2+x-6 = x(ax^2+bx+c)-(ax^2+bx+c) = ax^3+(b-a)x^2+(c-b)x-c$
$a = 1, b - a = 4 \to b = 4 + a = 4 + 1 = 5, c - b = 1 \to c = 1 + b = 1 + 5 = 6$
ഹരണഫലം $x^2 + 5x + 6$

c) $x^2 + 5x + 6 = x^2 + 2x + 3x + 6 = x(x + 2) + 3(x + 2) = (x + 2)(x + 3)$

d) $p(x) = (x+1)(x+2)(x+3)$, $p(x) = 0 \to (x+1) = 0$or$(x+2) = 0$or $(x+3) = 0$
$x = -1, -2. - 3$

7)



a) $AB \times AC = AD^2$

b) Consider riangle ABD, triangle ACD.
$\angle ADB = \angle ACD$
Since $AB = BD$ angles opposite to them are equal.$\angle BAD = \angle ADB$
That is $\angle ADB = \angle ACD \to AD = CD$ $AB \times AC = AD^2 \to AB \times AC = CD^2$

c) In triangle ACD, $\angle A = \angle C$. This is an isosceles triangle

d) Triangfle $APD$is a $30° - 60° - 90°$tyriangle .Side opposite to $30°$is 12 .$AD = 24$cm .Lanth of tangent is 24cm

8) a) $3, 5, 7 \cdots$

b) 9

c) $x_{10} = 3 + 9 \times 2 = 21$

d) $3 + 100 \times 2 = 205$

e) When the terms are divided by 2 we get the remainder 1.When 100 is divided by 2 we get the remainder 1.Not a term.

[1]

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Self Evaluation

Mathematics Test 14

1 hour

25 scores

1) Volume and surface area of a sphere are equal. What is the radius of the sphere ?

(a) 3 (b) 6 (c) 2 (d) 1

1 score

2) പുഴയ്ക്ക് കുറുകെ ഒരു പാലം നിർമ്മിച്ചിരിക്കുന്നു.പാലത്തിന്റെ നീളം 600മീറ്റർ .ഒഴുക്കിന്റെ ദിശയുമായി പാലം $45°$രൂപീകരിക്കുന്നു.

a) ഏകദേശചിത്രം വരക്കുക

b) പുഴയുടെ വീതി എത്രയായിരിക്കും?

2 score

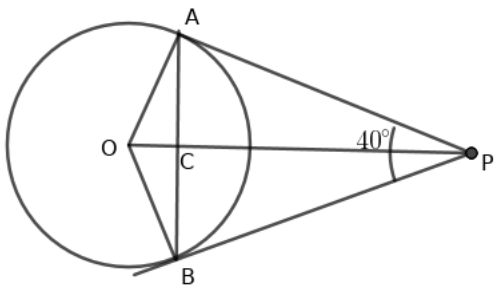
3) Vertices of a triangle are $A(8,6), B(8,-2), C(2,-2)$.

a) What is the centre of the circumcircle?

b) What is the radius of the circumcircle?

2 score

4) PA, PB are the tangents to the circle. O is the centre of the circle.



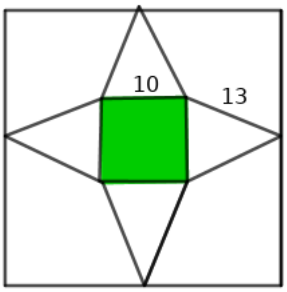
a) What are the measures of $\angle OAP, \angle OBP$

b) If angle $APB = 40°$ then what is angle AOB

c) The chords AB, CD intersect at C.How doses the lengths CO, CP, CA, CB related to eachother.

3 score

5) This is the outline for making a square pyramid drawn on a square paper.



a) What is the total lenght of its edges.

b) What is the slant height ?

c) What is the length of the side of the square paper taken for making the pyramid.സൂചിക നിർമ്മിക്കാൻ എടുത്ത സമചതുരക്കടലാസിന്റെ വശത്തിന്റെ നീളമെത്ര?

3 score

6) There is a circle with centre at the origin and radius 4

a) What are the points where the circle cut x axis x?

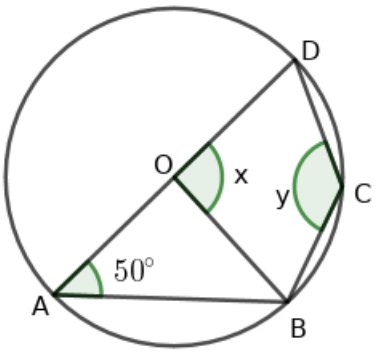
b) If $P(x, y)$ is a point on the circle , then write the equation of the circle.

c) Is $(2\sqrt{2}, 2\sqrt{2})$a point on this circle?

d) If $(2\sqrt{2}, 2\sqrt{2})$ is a vertex of a square and all other vertices are on this circle. Write the coordinates of the vertices.

4 score

7) $O$is the centre of the circle .$\angle DAB = 50^\circ$



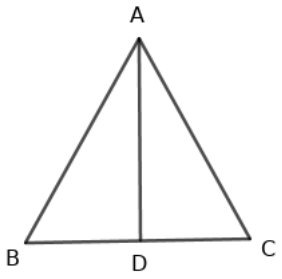
a) What is x

b) What is y

c) If $BC = CD$ then what is $\angle ADC$

d) If $BC = CD$ then what is $\angle ABC$

8) In triangle ABC, $AB = AC$
AD is the perpendicular from A to BC. This perpendicular distance is 2 more than BC. The area of the triangle is 60 sq.cm



a) If $BC = x$then what is AD?

b) Write an equation connecting BC, AD and area

c) What is the length of BC

d) What is the length of AD

e) Calculate the perimetre of the triangle.

5 score

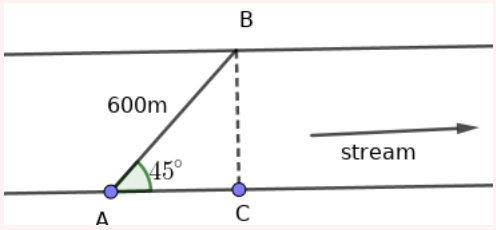
SJ Self Evaluation Series

Answers

1) ⋆ $\frac{4}{3}\pi r^3 = 4\pi r^2 \rightarrow r = 3$

⋆ Radius3cm

a) Diggram



b) width of the river $BC = \frac{600}{\sqrt{2}}$metre.

3) a) $(8,6), (8,-2)$are on a line parallel to y axis .The diatance between them is $\mid 6-(-2) \mid = 8$
$(8,-2), (2,-2)$are parallel to x axis . The distance between them is $\mid 8-2 \mid = 6$
This is a right triangle.ø
Centre of the circle is the mid point of the hypotenuse $O(\frac{8+2}{2}, \frac{6+-2}{2}) = O(5,2)$

b) Diagonal $\sqrt{8^2+6^2} = 10$. Radius of the circumcircle is 5

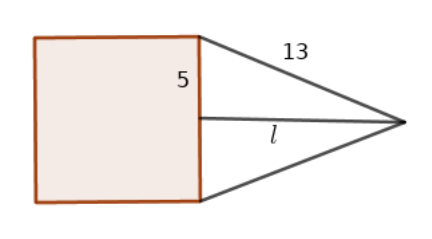
4) a) $\angle OAP = \angle OBP = 90°$

b) $OAPB$is a cyclic quadrilateral .
$\angle AOB + \angle APB = 180°$
$\angle AOB = 140°$

c) $OAPB$is a cyclic quadrilateral . A circle passes through the vertices. AB, OP are the chords of the circle intersect at C
$OC \times OP = CA \times CB$

5) a) Total length of the sides $= 4a + 4e = 4 \times 10 + 4 \times 13 = 40 + 52 = 92$cm

b) Look at the figure



$l = \sqrt{13^2 - 5^2} = 12$cm

c) Side of the square cardboard $= a + 2l = 10 + 2 \times 13 = 36$cm

6) a) The circle cut the axes at $A(4,0), B(0,4), C(-4,0), D(0,-4)$

b) Distance between $O(0,0)$ and $P(x,y)$ is $= \sqrt{(x-0)^2 + (y-0)^2} = 4$
$x^2 + y^2 = 4^2, x^2 + y^2 = 16$

c) $x = 2\sqrt{2}$ and $y = 2\sqrt{2}$, $x^2 + y^2 = 16$, $(2\sqrt{2})^2 + (2\sqrt{2})^2 = 8 + 8 = 16$.
$(2\sqrt{2}, 2\sqrt{2})$ are on the circle.

d) Points $(2\sqrt{2}, 2\sqrt{2})$,$(-2\sqrt{2}, 2\sqrt{2})$,$(-2\sqrt{2}, -2\sqrt{2})$,$(2\sqrt{2}, -2\sqrt{2})$

7) a) $x = 2 \times 50 = 100^\circ$

b) $ABCD$ is a cyclic quadrilateral .$y + 50 = 180$,$y = 180 - 50 = 130$

c) Draw BD .In triangle BDC, $CD = CB$
Angles opposite to equal sides are equal .
$\angle CDB = \angle DBC = \frac{180-130}{2} = 25^\circ$
In triangle ODB, $OD = OB$.Therefore $\angle ODB = \angle OBD = \frac{180-100}{2} = 40^\circ$
$\angle ADC = 25 + 40 = 65^\circ$

d) $\angle ABD = 90^\circ, \angle DBC = 25^\circ$
$\angle ABC = 90 + 25 = 115^\circ$

8) a) $AD = \sqrt{13^2 - x^2}$

b) $\frac{1}{2} \times BC \times AD = 60$
$\frac{1}{2} \times 2x \times \sqrt{13^2 - x^2} = 60$
$x\sqrt{13^2 - x^2} = 60$
$x^2(169 - x^2) = 3600$
If $x^2 = y$then $y(169 - y) = 3600$, $y^2 - 169y + 3600 = 0$.

c) Solving $y = 144, 25$.
$x^2 = 144$ആയാൽ ,$x = 12, -12$.
$x^2 = 25$,$x = 5, -5$
$x = 12$, $BC = 24$cm .
$x = 5$, $BC = 10$cm

d) perimetre $= 13 + 13 + 10 = 36$cm or $13 + 13 + 24 = 50$cm

[1]

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