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Class: 9
Subject: Mathematics
Topic: ASK1509SA2
No. of Questions: 30

Q1. When will be the graph of the equation x + a = 0 is a line parallel to the y-axis and to the left of the y-axis?

(a) a > 0
(b) a < 0
(c) a = 0
(d) a ≠ 0

Sol. (a)

Equations x + a = 0 or x = -a will be a line parallel to y – axis and to the left of the y-axis if and only if a > 0.

Q2. If the point (2, 3) lies on the line 4y = ax + 5, find a.

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

Sol. (b)

4y = ax + 5

$\because$ Point (2, 3) lies on the line (i)

$\therefore \quad 4 \times 3 = a \times 2 + 5$

$12 - 5 = -2a$

$2a = 7$

$a = \frac{7}{2}$

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Q3. Calculate the median of the given data: 144, 145, 147, 148, 149, 150, 152, 155, and 160.

(a) 148
(b) 147
(c) 149
(d) 150

Sol. (c)

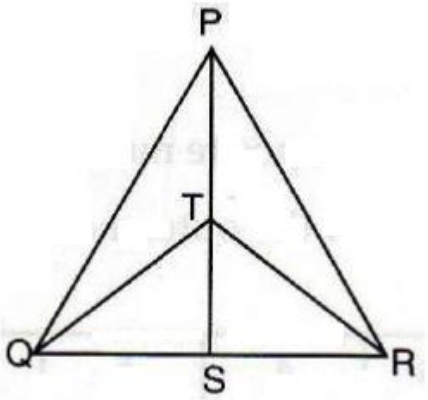
Data: 144, 145, 147, 148, 149, 150, 152, 155, 160

Here, N = 9(odd)

$\therefore \quad Median = \left(\frac{N+1}{2}\right)^{th} term$

$= \left(\frac{9+1}{2}\right)^{th} terms = 5^{th} term = 149.$

Q4. In the given fig., T is the mid-point of PS. Find ar (QTR).



(a) $ar\ (QTR) = \frac{1}{3}\ ar\ (PQR)$
(b) $ar\ (QTR) = \frac{1}{4}\ ar\ (PQR)$
(c) $ar\ (QTR) = \frac{1}{5}\ ar\ (PQR)$
(d) $ar\ (QTR) = \frac{1}{2}\ ar\ (PQR)$

Sol. (d)

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Median QT and RT divide Δ PQS and ΔPRS in two triangle of equal area.

$\therefore \quad ar\,(QTS) = \frac{1}{2}\,ar\,(PQS)$ ...(i)

$ar\,(RTS) = \frac{1}{2}\,ar\,(RPS)$ ...(ii)

From (i) + (ii), we get

$$ar\,(QTS) + ar\,(RTS) = \frac{1}{2}\,[ar(PQR) + ar(RPS)]$$

$$ar\,(QTR) = \frac{1}{2}\,ar\,(PQR)$$

Q5. In how many parts bisector of an angle divides it?

(a) Two parts
(b) Three parts
(c) Four parts
(d) One parts

Sol. (a)

Bisector of an angle divides it in two equal parts.

Q6. The edge of a cube is 10.5 mm. Find its total surface area in cm^2.

(a) 6.614 cm^2
(b) 6.615 cm^2
(c) 6.612 cm^2
(d) 6.611 cm^2

Sol. (b)

The edge of cube = 10.5 mm = $\frac{10.5}{10}\ cm$

= 1.05 cm

Total surface area of cube = $6a^2 = 6 \times 1.05 \times 1.05$

$$= 6.615\ cm^2$$

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Q7. A right circular cylinder is 3m high and the circumference of its base is 22m. Find its curved surface area.

(a) 65 m^2
(b) 64 m^2
(c) 63 m^2
(d) 66 m^2

Sol. (d)

Height h = 3 m

Circumference of base = 2πr = 22

Curved surface area of right Circular cylinder = 2πrh

$$= 22 \times 3 = 66\ m^2$$

Q8. For what value of p; x = 2, y = 3 is a solution of (p + 1)x – (2p + 3)y – 1 = 0 ? Also write the equation.

(a) $y = 1 + x$
(b) $x = 1 + y$
(c) $y = 1 - x$
(d) $y = -1 + x$

Sol. (a)

Solution x = 2, y = 3

(p +1) × 2 – (2p + 3) × 3 – 1 = 0

$2p + 2 - 6p - 9 - 1 = 0$

$p = -2$

Equation $-x + y - 1 = 0$

$$y = 1 + x$$

Q9. A toy is a in the form of a cone mounted on a hemisphere of base radius 3.5 cm. If the total height of the toy is 15.5 cm. Find its total surface area of the toy. $\left(Use\ \pi = \frac{22}{7}\right)$

(a) 214.49
(b) 214.48
(c) 214. 47
(d) 214.50

Sol. (d)

Total height of toy = 15.5 cm

Radius of semi- sphere = radius of cone = 3. 5 cm

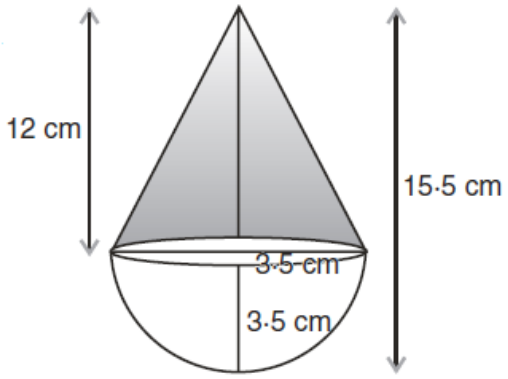
Height of cone (h) = 15. 5 – 3.5

= 12 cm

$l = \sqrt{h^2 + r^2} = \sqrt{12^2 + 3.5^2}$

$= \sqrt{144 + 12.25} = \sqrt{156.25}$

$= 12.5\ cm$



Total surface are of toy = $\pi rl + 2\pi r^2$

$= \pi r(l + 2r) = \frac{22}{7} \times 3.5\ (12.5 + 2 \times 3.5)$

$= 22 \times 0.5 \times 19.5$

$= 214\ .50\ cm^2$

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Q10. The floor of a rectangular hall has a perimeter of 250 m and its length and breadth are in the ratio of 13: 12. If the cost of painting the four walls and ceiling at the rate of Rs.5 per m^2 is Rs. 27, 000, find the height of the hall.

(a) 5 m
(b) 6 m
(c) 7 m
(d) 3 m

Sol. (b)

Let the length and breadth of a rectangular hall are 13x and 12x.

Perimeter of rectangular hall = $2\ (l + b)$

$$250\ = 2\ (13x + 12x)$$

$$125 = 25x$$

$$x = 5$$

$\therefore$ $l = 13 \times 5 = 65\ m\ ,\ b = 12 \times 5 = 60\ m$

Area of four wall and ceiling = $2\ (l + b)h + l \times b$

Cost of painting the four walls and ceiling at the rate of 5 per m^2

$$= [2(l + b)h + lb] \times 5$$

$$27000 = [2(65 + 60)h + 65 \times 60] \times 5$$

$$5400 = 250h + 3900$$

$$250\ h = 1500$$

$$h = 6\ m$$

Q11. Find the Mean and Median of first 12 odd composite numbers.

(a) 33.6, 34
(b) 34, 33.6
(c) 33.5, 34
(d) 34, 33.5

Sol. (a)

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First 12 Odd composite numbers are, 9, 15, 21, 25, 27, 33, 35, 39, 45, 49, 51, 55.

$$Mean = \frac{Sum\ of\ obeservation}{n}$$

$$= \frac{404}{12} = 33.6$$

Median = $\left[\frac{n^{th} obs}{2} + \left(\frac{n}{2} + 1\right)^{th}\ obs\right]/2$

$$= \frac{6^{th}\ obs + 7^{th}\ obs}{2}$$

$$= \frac{33+35}{2} = \frac{68}{2} = 34$$

Mean = 33.6

Median = 34

Q12. A die is thrown 500 times. The frequencies of the outcomes are recorded in the following frequency distribution table.

Outcome	1	2	3	4	5	6
Frequency	120	50	65	70	80	115

Find the probability of the occurrence of: a number between 3 & 6.

(a) 3/7
(b) 3/10
(c) 10/3
(d) 8/5

Sol. (b)

Probability (a number between 3 and 6) = $\frac{70+80}{500} = \frac{150}{500} = \frac{3}{10}$

Q13. The score of 15 students in an examination out of 10 marks is as below:

3, 9, 7, 5, 6, 3, 7, 6, 7, 4, 7, 7, 4, 8, 2. Find the mean, mode and median.

(a) 5
(b) 4
(c) 7
(d) 6

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Sol. (d)

Write the given data in ascending order 2, 3, 3, 4, 4, 5, 6, 6, 7, 7, 7, 7, 7, 8, 9

Here $n = 15\ (odd)$

$$Mean = \frac{\sum x}{n}$$

$$\frac{2+3+3+4+4+5+6+6+7+7+7+7+7+8+9}{15}$$

$$= \frac{85}{15} = 5.6$$

Mode = 7

Median = $\left(\frac{n+1}{2}\right)^{th}\ term = \left(\frac{15+1}{2}\right)^{th}\ term$

$= 8\ th\ term = 6$

Q14. A wall of length 10 m was to be built across an open ground. The height of the wall is 9 m and thickness of wall is 36 cm. If this wall is to be built up with bricks whose dimensions are 36 cm × 15 cm × 9 cm, how many bricks would be required to build three fourth of this wall?

(a) 5000
(b) 6000
(c) 4000
(d) 5500

Sol. (a)

Length of wall (l) = 10 m = 1000 cm

Thickness of wall (b) = 36 cm

Height of wall (h) = 9 m = 900 cm

No. of bricks (for three fourth of this wall) = $\frac{\frac{3}{4}\times\text{Area of wall}}{\text{Area of one brick}}$

$$= \frac{3}{4} \times \frac{1000\times36\times9000}{36\times15\times9}$$

$$= 5000\ bricks$$

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Q15. A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius of the tank is 1m, then find the volume of the iron used to make the tank. $(use\ \pi = 3.14)$

(a) $63430.08\ cm^3$
(b) $63430.07\ cm^3$
(c) $63430.06\ cm^3$
(d) $63430.09\ cm^3$

Sol. (d)

Inner radius of hemisphere (x) = 1 m = 100 cm

Outer radius of hemisphere (R) = 100 + 1 = 101 cm

Volume of hemisphere (used to make the tank) $= \frac{2}{3}\pi\ (R^3 - r^3)$

$$= \frac{2}{3} \times 3.14 \times (101^3 - 100^3)$$

$$= 63430.09\ cm^3$$

Q16. Arithmetic means of terms, 21, 16, 24, x, 29, 15 is 23. Find the value of x.

(a) 34
(b) 33
(c) 37
(d) 35

Sol. (b)

A.M. $= \frac{21+16+24+x+29+15}{6}$

$$23 = \frac{105+x}{6}$$

$$\Rightarrow \quad 105 + x = 138 \Rightarrow x = 33$$

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Q17. Two opposite angles of a parallelogram are $(3x-2)^{\circ}\ and\ (63-2x)^{\circ}$. Find the angles of parallelogram.

(a) $37^{\circ}, 143^{\circ}, 37^{\circ}, 143^{\circ}$
(b) $40^{\circ}, 140^{\circ}, 37^{\circ}, 143^{\circ}$
(c) $37^{\circ}, 143^{\circ}, 50^{\circ}, 130^{\circ}$
(d) $80^{\circ}, 100^{\circ}, 37^{\circ}, 143^{\circ}$

Sol. (a)

Since opposite angles of parallelogram are equal.

$\therefore \quad 3x-2=63-2x$

$3x+2x=63+2$

$5x=65$

$x=\frac{65}{5}=13^{\circ}$

Angles of parallelogram

$(3\times 13-2)^{\circ}, (180^{\circ}-37^{\circ}), (63^{\circ}-2\times 13)^{\circ}, (180^{\circ}-37^{\circ})$

$i.e.\ 37^{\circ}, 143^{\circ}, 37^{\circ}, 143^{\circ}$

Q18. Find the mean of the following distribution:

X	4	6	9	10	15
F	5	10	10	7	8

(a) 7
(b) 8
(c) 9
(d) 9.5

Sol. (c)

Mean $(\overline{x}) \quad =\frac{\sum fx}{n}=\frac{360}{40}=9$

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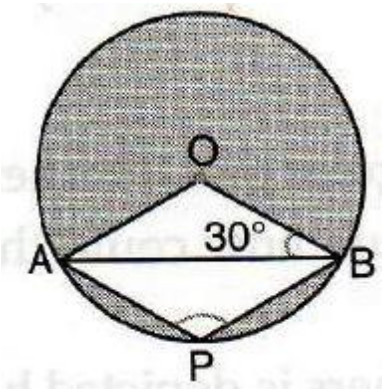
Q19. In the given figure, if O is the centre of circle, determine ∠APB.



(a) 120°
(b) 150°
(c) 130°
(d) 110°

Sol. (a)

In ΔAOB,

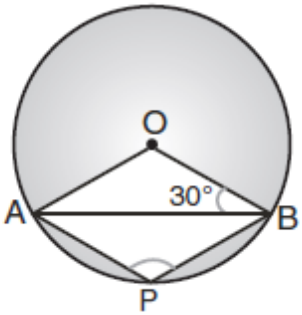
OA = OB (radii of circle)

$\therefore \quad \angle OAB = \angle OBA = 30°$

Again, $\angle AOB = 180° - \angle OAB - \angle OBA$

$= 180° - 30° - 30° = 120°$

Reflex $\angle AOB = 360° - 120° = 240°$



$\angle APB = \frac{1}{2}\, Reflex\ \angle AOB$ (Angle subtended by an arc at any point on the remaining part of the circular is half the angle subtended by it at the centre)

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$$\frac{1}{2} \times 240° = 120°$$

Q20. The largest sphere is curved out of a cube of side 7 cm. Find the volume of the sphere $\left(Use\ \pi = \frac{22}{7}\right)$

(a) 179.65 cm^3
(b) 179.64 cm^3
(c) 179.66 cm^3
(d) 179.68 cm^3

Sol. (c)

Radius of the sphere = $\frac{1}{2} \times the\ edge\ of\ the\ cube = \frac{7}{2}$

Volume of the sphere = $\frac{4}{3}\ \pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}$

$= 179.66\ cm^3$

Q21. The record of a weather station shows that out of the part 300 consecutive days, its weather forecast was correct 175 times. What is the probability that on a given day: It was correct?

(a) 5/12
(b) 2/3
(c) 7/6
(d) 7/12

Sol. (d)

Probability $(it\ was\ correct) = \frac{Number\ of\ outcomes}{Total\ number\ of\ possibilites}$

$= \frac{175}{300} = \frac{7}{12}$

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Q22. Find two different solutions to the equation $2x + 6y + 1 = 0$

(a) 3, - 2
(b) -3, 2
(c) -2 , 3
(d) 2, -3

Sol. (b)

Equation $2x + 6y = +1 = 0$

Put x = 0 in equation (i)

$2 \times 0 + 6y + 1 = 0$

$6y = -1$

$y = -\frac{1}{6}$

Solution is $\left(0, -\frac{1}{6}\right)$

Put y = 0 in equation (i) $2x + 0 + 1 = 0$

$x = -\frac{1}{2}$

Solution is $\left(-\frac{1}{2}, 0\right)$

So, (-3, 2), is not a solution of given equation.

Q23. Find the points where the line $2x + 3y = 6$ cuts the x –axis and y-axis.

(a) x =(0, 3) , y = (0, 2)
(b) x =(3, 0) , y = (2, 0)
(c) x =(3, 0) , y = (0, 2)
(d) x =(- 3, 0) , y = (0, 2)

Sol. (c)

Equation $2x + 3y = 6$

$put\ y = 0\ in\ equation\ (i)$

$2x + 0 = 6$

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$$x = 3$$

Point is (3, 0)

Put x = 0 in equation (i)

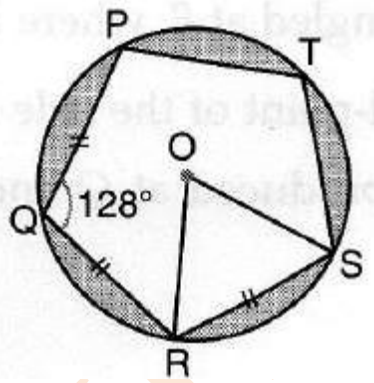
$$0 + 3y = 6$$

$$y = 2$$

Point is (0, 2)

Hence, the line $2x + 3y = 6$, cut the x-axis at (3, 0) and y-axis at (0, 2).

Q24. In the given figure PQ = QR = RS and $\angle PQR = 128°$. Find $\angle PTS$ and $\angle ROS$.



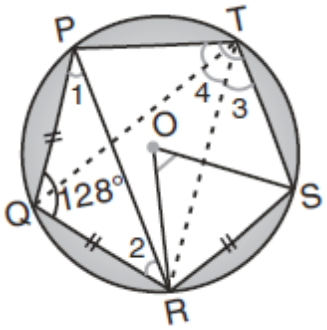
(a) 78° , 52°
(b) 80° , 50°
(c) 42° , 88°
(d) 62° , 68°

Sol. (a)

PQ = QR = RS, $\angle PQR = 128°$

$\angle 1 + \angle 2 = 180° - 128° = 52$

Since $\angle 1 = \angle 2$, therefore, $\angle 1 = \angle 2 = \frac{52}{2} = 26°$



$\angle PTQ = \angle QRP = 26°$

$\angle PTS = 3\angle PTQ = 3 \times 26° = 78°$

$\angle ROS = 2\angle RTS = 2 \times 26° = 52°$

Q25. The external and internal diameters of hollow hemi-spherical vessels are 16 cm and 12 cm respectively. The cost of paining 1 sq. cm of surface is Rs. 2. Find the cost of paining the vessel all over. $\left(Use\ \pi = \frac{22}{7}\right)$

(a) Rs. 1385.43
(b) Rs. 1394.43
(c) Rs. 1395.43
(d) Rs. 1392.43

Sol. (c)

External diameter = 16 cm

Radius $(R) = \frac{16}{2} = 8\ cm$

Internal diameter = 12 cm

Radius (r) = $\frac{12}{2} = 6\ cm$

Total surface area is to be painted = $2\pi R^2 + 2\pi r^2 + \pi R^2 - \pi r^2$

$= 3\pi R^2 + \pi r^2 = \pi[3R^2 + r^2]$

Cost of painting the vessel all over = $2 \times \pi\ [3R^2 + r^2]$

$= 2 \times \frac{22}{7}\ [3 \times 8^2 + 6^2]$

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$= 2 \times \frac{22}{7} [192 + 36]$

= Rs. 1395.43

Q26. Find the area of the metal sheet required to make two closed hollow cones each of height 24 cm and slant height 25 cm.

(a) $10000\ cm^2$
(b) $11000\ cm^2$
(c) $12000\ cm^2$
(d) $13000\ cm^2$

Sol. (b)

Height of cone (h) = 24 cm

Slant height of cone (l) = 25 cm

Radius (r) = $\sqrt{l^2 - h^2} = \sqrt{25^2 - 24^2}$

$= \sqrt{625 - 576} = \sqrt{49}$

= 7 cm

Area of metal sheet (to make two hollow cones) = $2 \times \pi rl = 2 \times \frac{22}{7} \times 7 \times 25$

$= 11000\ cm^2$

Q27. If the mean of the following distribution is 6, find the value of n.

X	2	4	6	10	n + 5
f	3	2	3	1	2

(a) 5
(b) 8
(c) 7
(d) 6

Sol. (c)

X	f	fx
2	3	6
4	2	8
6	3	18
10	1	10
n + 5	2	2n + 10
	$\sum f = n = 11$	$\sum fx = 52 + 2n$

Mean $(\overline{x}) = \frac{\sum fx}{n}$

$6 = \frac{2n+52}{11}$

$66 = 52 + 2n$

$2n = 66 - 52$

$2n = 14$

$n = \frac{14}{2}$

N = 7

Q28. Lead spheres of diameter 6 cm each are dropped into a cylindrical beaker containing some water and are fully submerged. IF the diameter of the beaker is 18 cm and water level rises by 40 cm, find the number of lead sphere dropped in the water.

(a) 80
(b) 90
(c) 100
(d) 70

Sol. (b)

Radius of lead sphere (r) = $\frac{6}{2} = 3\ cm$

Radius of beaker (R) = $\frac{18}{2} = 9\ cm$

Height of rised water level (H) = 40 cm

No. of lead spheres dropped in the water = $\frac{\text{Volume of raised water level in cylindercal beaker}}{\text{volume of one lead Sphere}}$

$$= \frac{\pi R^H}{\frac{4}{3}\pi r^3} = \frac{9\times9\times40\times3}{4\times3\times3\times3}$$

$$= 90.$$

Q29. The area of three adjacent faces of cuboid are 15sq cm, 20 sq cm and 12 sq cm. Find the volume of the coboid.

(a) $60\ cm^2$
(b) $35\ cm^2$
(c) $40\ cm^2$
(d) $50\ cm^2$

Sol. (a)

Area of three adjacent face of cuboid are lb, bh and hl, where l, b and hl, l, b and h are length, breadth and height of cuboid respectively then

$$lb = 15\ cm^2, bh = 20\ cm^2, hl = 12\ cm^2$$

$$lb \times bh \times hl = 15 \times 20 \times 12$$

$$(lbh)^2 = 3 \times 5 \times 4 \times 5 \times 3 \times 4$$

Volume of cuboid = $lbh = 3 \times 4 \times 5 = 60\ cm^2$

Q30. A circle has radius $\sqrt{2}$ cm. It is divided into two segments by a chord of length 2 cm. The angle subtended by the chord at a point in major segment is

(a) 60°
(b) 75°
(c) 45°
(d) 90°

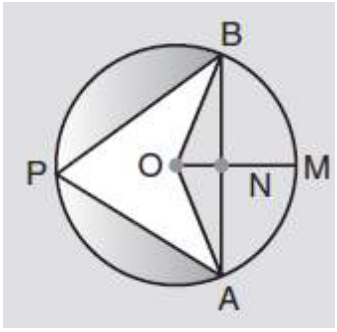
Sol. (c)

In ΔONB,

$$OB^2 = ON^2 + NB^2 \quad \text{(by Pythagoras theorem)}$$

$$\Rightarrow \quad \left(\sqrt{2}\right)^2 = ON^2 + 1^2$$

$$\Rightarrow \quad ON = 1$$



$\therefore\ \Delta ONB$ *is an isocees triangle*

$\angle ONB = 90°$ ($\because$ ON is the perpendicular bisector of chord AB)

$\therefore \quad \angle NOB = \angle NBO = 45°$

Similarly, $\angle AON = 45°$

$\angle AON = \angle AON + \angle NOB$

$= 45° + 45°$

$= 90°$

$\angle APB = \frac{1}{2}\angle AOB$ (Chord subtends an angle is twice angle subtends by an arc.)

$\frac{1}{2} \times 90 = 45°$