A(MCQ BASED ON CBSE PATTERN)

Q: 1 **0.8888... is a non terminating decimal number.**

Which of these fractions is the same as 0.8888...?

1 $\frac{8}{9}$ **2** $\frac{88}{90}$

3 $\frac{88}{100}$ **4** $\frac{888}{1000}$

Q: 2 **Which of these is an irrational number between √5 and √17?**

1 1.2121121112... **2** 3.625 **3** 3.7575575557... **4** √16

Q: 3 **$3\sqrt{108} - 2\sqrt{98}$ =**

1 4 **2** √10 **3** √2(14 - 9√3) **4** 18√3 - 14√2

Q: 4 $\frac{7}{\sqrt{10}+\sqrt{3}}$ =

1 7 (√10 + √3) **2** 7 (√10 - √3) **3** (√10 + √3) **4** (√10 - √3)

Q: 5 **How many zero(es) does the polynomial $34x^2 - 17x - 17$ have?**

1 0 **2** 1 **3** 2 **4** 3

Q: 6 **In which of the quadrants is the point (-4, 1)?**

1 I quadrant **2** II quadrant **3** III quadrant **4** IV quadrant

solution of the eq. $y = 2x - 2$

Q: 7 **Which of the following graphs represents the equation $y = 2x - 2$?**

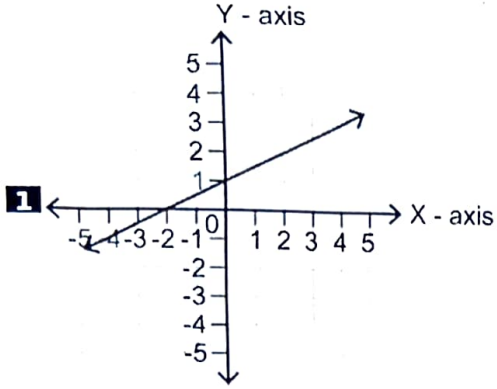
a (6, 4)

b (4, 6)

c (-6, -4)

d (-4, -6)

1



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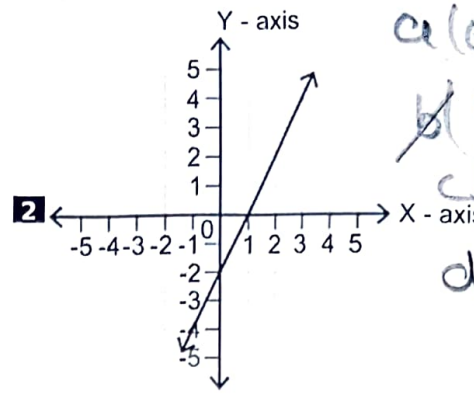

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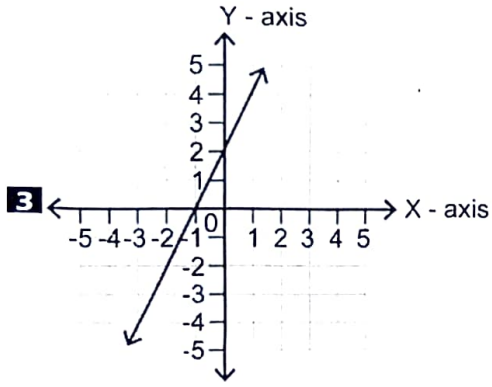

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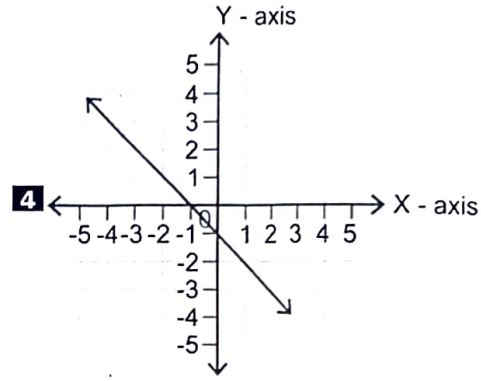
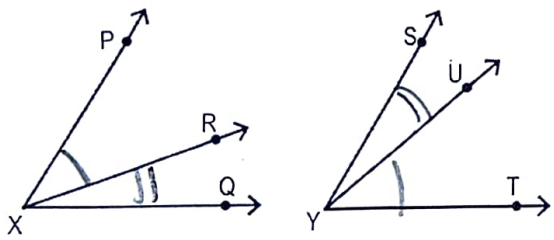


Q: 8

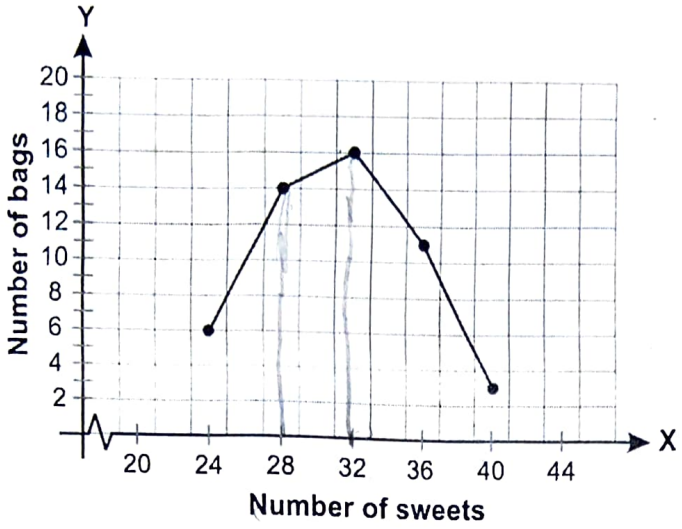


In the above figure, ∠PXR = ∠UYT and ∠RXQ = ∠SYU.

Which of these is true?

1 ∠PXR = ∠QXR **2** ∠PXR = ∠SYU **3** ∠PXQ = ∠UYT **4** ∠PXQ = ∠SYT

50 bags of sweets were opened. The frequency polygon below shows the distribution of the number of sweets in each bag.

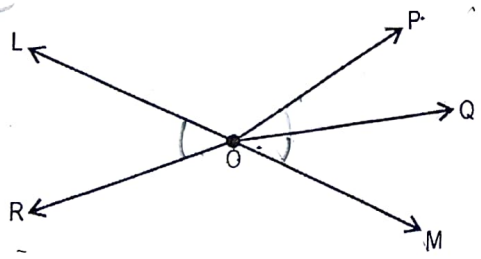


Study the graph and answer the question(s) that follow.

Q: 9 **From the graph we can conclude that the MAXIMUM number of bags had _____ sweets.**

1. exactly 32
2. between 28 and 32
3. between 30 and 34
4. between 32 and 36

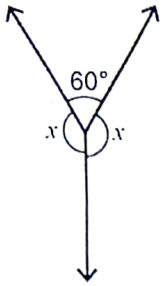
Q: 10 **Line LM and rays OP, OQ, and OR meet at point O.**



Under which of the following conditions will ∠LOR be equal to ∠QOM?

1. when ∠LOP = ∠ROM
2. when L, O and Q are collinear.
3. when R, O and Q are collinear.
4. when R, O and P are collinear.

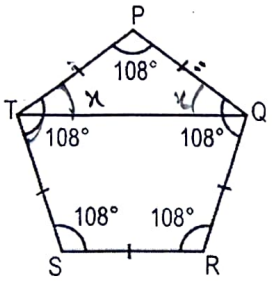
Q: 11 **The angles marked *x* in the figure below are equal in measure.**



What is the value of *x* ?

1 60° **2** 75° **3** 120° **4** 150°

Q: 12 **PQRST is a regular pentagon. Each of its angles measures 108° and all its sides are equal in length.**



$108 + 2x = 180$

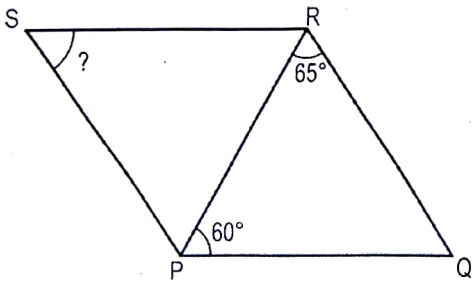
$2x = 72$

$x = 36$

What is the measure of ∠PQT?

1 18° **2** 36° **3** 54° **4** 72°

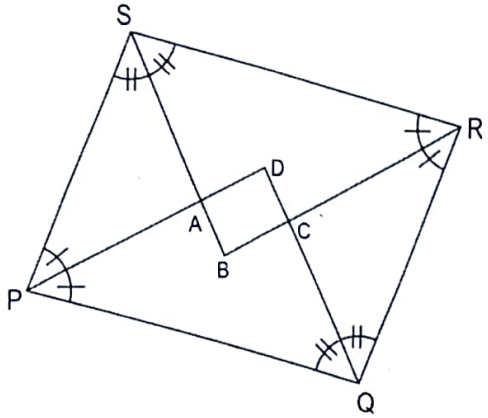
Q: 13 **Shown below is a parallelogram. ∠RPQ = 60°. ∠PRQ = 65°.**



(Note: The figure is not to scale.)
What is the measure of ∠PSR?

1 55° **2** 60°
3 65° **4** 125°

Q: 14 **Shown below is the parallelogram PQRS. Points A, B, C, and D are the vertices of the quadrilateral formed by the corresponding angle bisectors of the four internal angles of the parallelogram.**



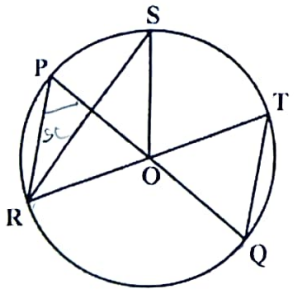
(Note: The figure is for representational purposes only.)

The quadrilateral ABCD is a:

(i) rectangle
(ii) rhombus
(iii) square

1 only (i)
2 either i) or iii)
3 either (ii) or (iii)
4 either (i), (ii), or (iii)

Q: 15 **The figure below shows a circle with centre O.**



∠RPQ = 50°. Which of these angles can you conclude to be 50° based on the given information?

1 only ∠RSO
2 only ∠RTQ
3 only ∠POR
4 both ∠RSO and ∠RTQ

Q: 16 **Two triangles have the same semi-perimeter.**

Do the two triangles NECESSARILY have the same area?

1. Yes, as their perimeters are equal.
2. No, as their perimeters can be different.
3. No, as their side lengths can be different.
4. Yes, as their semi-perimeters are the same.

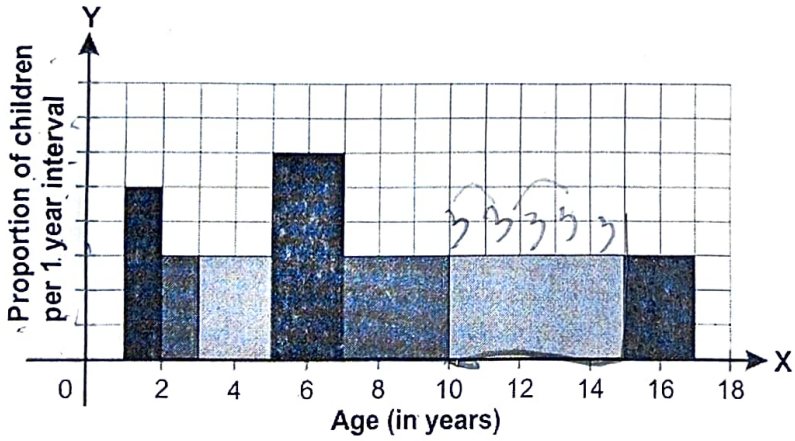
Q: 17 **A solid right circular cone of total surface area 704 cm^2 has base radius of 7 cm.**

What is the vertical height of the cone?

(*Note: Take π as* $\frac{22}{7}$.)

1. $13\frac{5}{7}$ cm
2. 18 cm
3. 24 cm
4. 25 cm

The following histogram shows the frequency distribution of the ages of children in a locality.



Study the histogram and answer the question(s) that follow.

Q: 18 **How many children are there in the age group 10 -15?**

1. 3
2. 6
3. 9
4. 15

Q: 19 **A line *k* is twice as long as line *m*, and line *n* is 4 times as long as line *m*. Line *s* is half as long as line *n*.**

Two statements based on the information above are given below - one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements (A) and (R).

***Assertion (A)* : Line *s* is as long as line *k*.**

***Reason (R)* : Things which are double the same things are equal to one another.**

1. Both (A) and (R) are true, and (R) is the correct explanation for (A).
2. Both (A) and (R) are true, and (R) is not the correct explanation for (A).
3. (A) is true but (R) is false.
4. (A) is false but (R) is true.

Q: 20 **S is a sphere of radius 1 cm, and H is a hemisphere of radius 2 cm.**

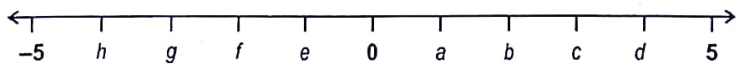
Two statements are given below - one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements (A) and (R).

***Assertion (A)* : The volume of S is equal to that of H.**
***Reason (R)* : The radius of H is twice that of S.**

1. Both (A) and (R) are true and (R) is the correct explanation for (A).
2. Both (A) and (R) are true but (R) is not the correct explanation for (A).
3. (A) is false but (R) is true.
4. Both (A) and (R) are false.

B(VERY SHORT Q)

Q: 21 **Observe the number line given below.** **[2]**



Use this number line to locate the position of the following irrational numbers between any two consecutive letters.

i) $-\frac{\pi}{2}$

ii) $(3\sqrt{2} - 2\sqrt{2})$

iii) $\frac{4\sqrt{12}}{\sqrt{16}}$

Q: 22 Expand and simplify the expression below using a suitable identity. [2]

$\left(\frac{1}{2}x - \frac{1}{3}y + 6z\right)^2$

Show your steps.

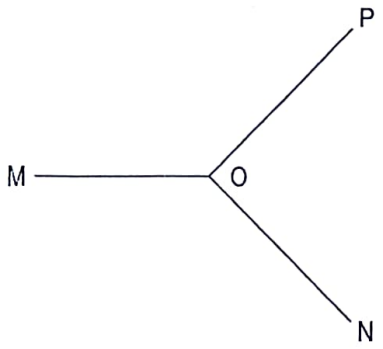
Q: 23 Smith has a solid of volume $64x^3 - 144x^2 + 108x - 27$ cubic units. [2]

Is the solid a cube? Justify your answer.

Q: 24 $p(x) = 3x^3 - 9x^2 + qx + 6$ where q is a non-zero real number. One of the factors of $p(x)$ is $(x + 1)$. [2]

Evaluate $q^2 + 2q + 1$. Show your work.

Q: 25 [2]



In the above figure, OP and ON are each twice as long as OM.

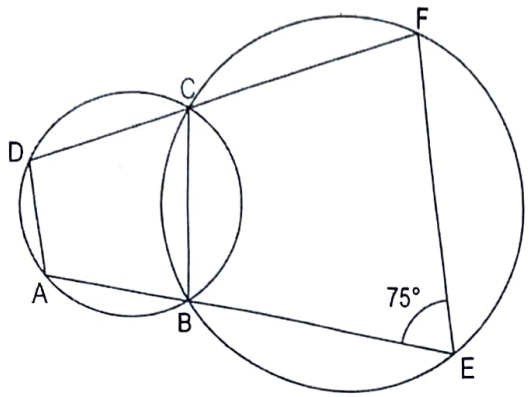
Find the relationship between the lengths of OP and ON. Show your steps.

Q: 26 In a quadrilateral ABCD, the diagonals AC and BD intersect at O such that AO:AC = 1:2 and BD:DO = 2:1. [2]

i) ABCD is DEFINITELY which type of quadrilateral?
ii) Name an angle in the quadrilateral that is equal to ∠CAD.

Give valid reasons.

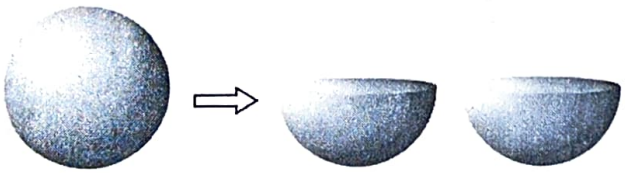
Q: 27 Two circles intersect at B and C. The quadrilaterals ABCD and BEFC are inscribed in the circles such that DCF and ABE are straight lines as shown below. [2]



(Note: The figure is not to scale.)

If ∠BEF = 75°, find ∠DCB. Show your steps and give valid reasons.

Q: 28 A solid sphere of radius 10 cm is cut into two hemispheres as shown below. [2]



What is the surface area of each hemisphere formed? Show your steps.

C(SHORT Q/A AS PER BOARD PATTERN)

Q: 29 Factorise the following expression. [3]

$64\,x^3 - \frac{1}{27}\,y^3 + 125\,z^3 + 20\,xyz.$

Show your steps.

Q: 30 Utsav is making a plan to construct a square lawn in his backyard. He draws a square on a coordinate grid with corners located at P(-2, 0), Q(2, 0), R(2, 4) and S(-2, 4). [3]

a) Plot the above points on the coordinate grid and draw the square.

b) Find the perimeter of the square in units.

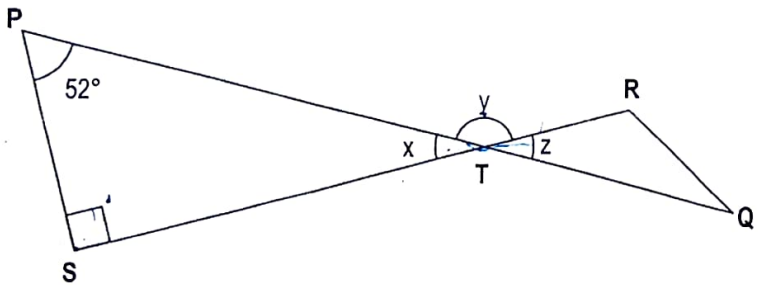
c) Utsav plans to have a water fountain in the centre of the lawn. What will be the coordinates of the fountain on the same grid?

Show your work.

Q: 31 a) Write an equation of a line that passes through the point (1, 0). [3]

b) Write two more solutions of the equation written for part a).

Q: 32 In the figure shown below, line PQ intersects with RS at T. [3]



(Note: The figure is not to scale.)

Find the measures of x, y and z. Show your work with valid reasons.

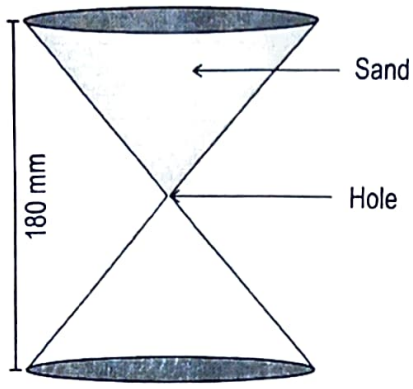
Q: 33 Prove that the diagonals of a rhombus are perpendicular to each other. [3]

Show your steps and give valid reason for each step.

Q: 34 The sides of a triangle are given by n cm, $(2n + 1)$ cm and $(3n - 1)$ cm respectively. [3]

If the area of triangle is $2n\sqrt{3}$ cm^2 then find the measures of sides of the triangle. Show your work.

Q: 35 **Two identical right circular cones are used to make a sand timer as shown below.** **[3]**



(Note: The figure is not to scale.)

The rate of flow of sand through the hole is 1925 mm^3 per second. The height of the sand timer is 180 mm. A completely full top cone takes 4 minutes to empty itself.

What is the approximate radius of the base of each cone? Show your work.

(Note: Take π as $\frac{22}{7}$.)

D(LONG Q/A AS PER CBSE PATTREN)

Q: 36 **Simplify the equation below to find the value of A.** **[5]**

$$\frac{p^{\frac{1}{5}} \times p^{\frac{2}{5}}}{\left(p^{2} \times p^{\frac{-4}{5}}\right)^{\frac{5}{2}}} = \frac{p}{p^{1-A}}$$

Show your work.

Q: 37 **In a circle, PQ and RS are two chords parallel to each other on either sides of the centre, O. PQ = 12 cm and RS = 16 cm.** **[5]**

If the distance between PQ and RS is 14 cm, find the radius of the circle. Draw a figure and show your work with valid reasons.

Q: 38 **Jyoti has set up a stall at an exhibition to sell her artwork. To keep track of the number of items for sale in different price ranges, Jyoti made the following table for her reference.** [5]

Selling Price (in Rs)	Number of Items For Sale
0 - 500	18
500 - 1000	12
1000 - 1500	10
1500 - 2000	7
2000 - 2500	12
2500 - 3000	15
3000 - 3500	14
3500 - 4000	0
4000 - 4500	7
4500 - 5000	5

i) Draw a histogram representing the data from the above table.
ii) Using the histogram from i), draw a frequency polygon representing the same data.
iii) State whether the following statement is true or false. Justify your answer.

"Using the given data, it is possible to find the number of artworks for sale for Rs 3999."

E(CASE STUDY BASED AS PER CBSE PATTERN)

Answer the questions based on the given information.

The table below shows how the electricity company charges Rishabh for his energy consumption every month. Each bill consists of a fixed charge and a variable charge. Either one of the fixed charges is applied on the bill depending on the total energy consumption.

Fixed Charge	
If total units are	Rate
50 units or less	Rs 110
More than 50 units	Rs 210

Variable Charge	
Units	Rate
For the first 100 units	Rs 5 per unit
For every additional unit beyond 100 units	Rs 7 per unit

Q: 39 **Rishabh consumed more than 150 units of energy in April.** [2]

Frame an equation for the bill amount. Show your work.

Q: 40 **For November, Rishabh paid Rs 320 for his electricity bill. He paid a fixed charge of Rs 110.** **[1]**

How many units of energy did he consume in November? Show your work.

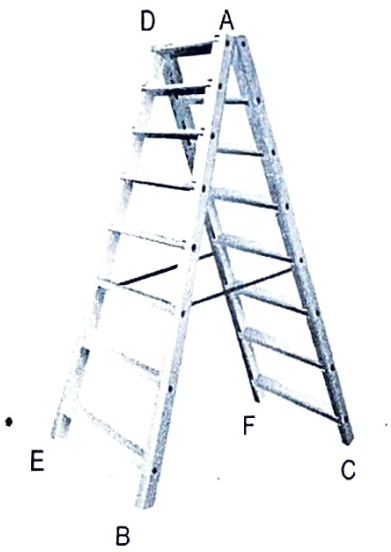
Q: 41 **Rishabh consumed 250 units in June.** **[1]**

Find the bill amount for June. Show your work.

Answer the questions based on the given information.

A company manufactures double sided step ladders. For better stability, it is recommended to keep the angle between the top of both the ladders between 75 and 90 degrees.

The company manufactured one sample design, as shown below, where the top of both the ladders depicted by points A and D are at a vertical height of 1.2 m from the ground. The base of the ladders when fully opened (BC and EF) are 1 m apart from each other as shown below.



(Note: The figure is not to scale.)

Q: 42 **If a perpendicular is drawn from top of the ladder to the ground, it divides the distance along the ground between the base of both the ladders in half.** **[2]**

Find the length of each ladder. Draw a rough diagram. Show your work.

Q: 43 **The angle between the top of ladders is 90° when opened and placed on the ground. If both the ladders are equal in length, find the angle that the ladders make with the ground when opened. Show your work.** **[1]**

Q: 44 The midpoints of each ladder are connected by two equal rods as shown in red in the given figure. [1]

Find the length of the rods. Justify your answer and show your work.

End of Questions in Paper