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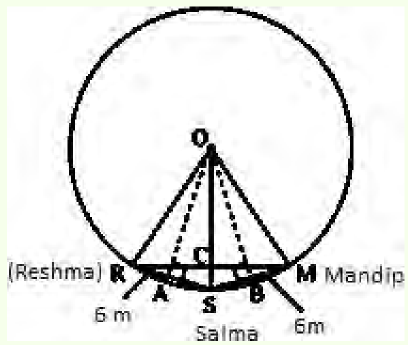
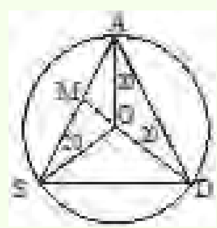
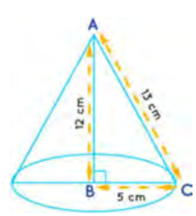
Class IX Supplementary Examination 2023-24

SUBJECT : MATHEMATICS

Marking Scheme

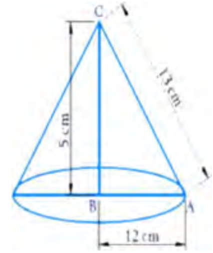
Q. No.	Solution	Marking Details
1	(b) $\frac{37}{300}$	1
2	(c) 1.5	1
3	(b) 85-100	1
4	(a) 288 π cubic cm	1
5	(c) 23	1
6	(c) 168^{o}	1
7	(b) definition	1
8	(a) 4 cm	1
9	(d) not defined	1
10	(c)infinitely many solutions	1
11	(a) SAS	1
12	(c) 105^{o}	1
13	(a) $7\sqrt{6}$	1
14	(d) 27	1
15	(a) 25^{o}	1
16	(c) 55^{o}	1
17	(a) 4	1
18	(b) 4	1
19	(c) Assertion (A) is true but reason (R) is false.	1
20	(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)	1
21	For correct representation For correct measurement	1 1
22	For correct value x=a putting Find b=0	1 1
23	For correct proof step by step marks provide Or Four every correct postulates	2 .5+.5+.5+.5
24	s = 16 cm, $s - a$ = (16 – 8) cm = 8 cm, $s - b$ = (16 – 11) cm = 5 cm, $s - c$ = (16 – 13) cm = 3 cm. for Heron's formula Therefore, area of the triangle = $8\sqrt{30}$ Sq.cm	.5 .5 1
25	∠ POS = ∠ROQ = 105° (Vertically opposite angles) and ∠ SOQ = ∠ POR = 75° or Draw a line parallel to ST through point R ∠ QRS= 60	1 1 1 1
26	x=13, y=-7	1.5 1.5
27	g(x) = 0 $x^2 - 3x + 2 = 0$ (x – 1) (x – 2) = 0 Therefore x = 1 or x = 2 Show f(1)= 0 and f(2) =0	 1.5 1.5

	Or Using factor find p(1)=0 (x-1) is a factor, divide polynomial by (x-1) Factors are (x-1)(x-10)(x-12)	 1 1 1
28	For correct equations There are infinite lines Because infinite line can pass through given one point.	1 1 1
29	$y + 55^\circ = 180^\circ$ (Interior angles on the same side of the of the transversal ED) Therefore, $y = 180^\circ – 55^\circ = 125^\circ$ Again $x = y$ (AB ‖ CD, Corresponding angles axiom) Therefore $x = 125^\circ$ Now, since AB ‖ CD and CD ‖ EF, therefore, AB ‖ EF. So, $\angle EAB + \angle FEA = 180^\circ$ (Interior angles on the same side of the transversal EA) Therefore, $90^\circ + z + 55^\circ = 180^\circ$ Which gives $z = 35^\circ$ OR Since BE and FC are normal to PQ and RS respectively, therefore, BE‖FC Let, $\angle ABE = \angle EBC = x$[PQ is a mirror, so angle of incidence is equal to angle of reflection] $\angle FCD = \angle BCF = y$[RS is a mirror, so angle of incidence is equal to angle of reflection] Now considering BE and FC, taking BC as transversal, $\angle EBC = \angle BCF$ .... (i) [alternate interior angle] i.e. $x=y$ i.e. $\angle ABE = \angle FCD$..... (ii) Adding equation (i) and (ii) $\angle EBC + \angle ABE = \angle BCF + \angle FCD$ $\angle ABC = \angle BCD$ Now if we take line AB and CD in consideration, alternate interior angles that are $\angle ABC$ and $\angle BCD$ are equal. Therefore, AB‖CD	 1 1 1 .5 .5 .5 .5 .5 .5
30	In ΔAMC and ΔBMD AM=BM (M is midpoint of AB) $\angle AMC = \angle BMD$(vertically opposite angles)CM=DM (given) $\therefore \Delta AMC \cong \Delta BMD$ (by SAS congruence rule) $\therefore$ AC=BD (by CPCT) $\Rightarrow \angle DBC + \angle ACB = 180^\circ$(co−interior angles) $\Rightarrow \angle DBC + 90^\circ = 180^\circ (\angle ACB = 90^\circ) \Rightarrow \angle DBC = 180^\circ - 90^\circ \Rightarrow \angle DBC = 90^\circ$ $\Rightarrow$DB=AC (By CPCT)…(i) In ΔDBC and ΔACB DB=AC (From (i))BC=BC(Common)$\angle DBC = \angle ACB = 90^\circ$ $\therefore \Delta DBC \cong \Delta ACB$ by SAS congruence	 1 1 . 1
31	For correct identity VIII (I) -1260 (ii) 16380	1 1 1
32	It is given that PS ‖ QR and transversal p intersects them at points A and C respectively. The bisectors of $\angle PAC$ and $\angle ACQ$ intersect at B and bisectors of $\angle ACR$ and $\angle SAC$ intersect at D. We are to show that quadrilateral ABCD is a rectangle. Now, $\angle PAC = \angle ACR$ (Alternate angles as $l \parallel m$ and p is a transversal) So,$1/2 \angle PAC = 1/2 \angle ACR$ i.e., $\angle BAC = \angle ACD$ These form a pair of alternate angles for lines AB and DC with AC as transversal and they are equal also. So, AB ‖ DC Similarly, BC ‖ AD (Considering $\angle ACB$ and $\angle CAD$) Therefore, quadrilateral ABCD is a parallelogram.	 1 1 1 1

	Also, ∠ PAC + ∠ CAS = 180° (Linear pair) So, 1/2PAC +1/2CAS =1/2× 180° = 90° or, ∠ BAC + ∠ CAD = 90° or, ∠ BAD = 90° So, ABCD is a parallelogram in which one angle is 90°. Therefore, ABCD is a rectangle. OR (i) In quadrilateral APCQ, AP ∥ QC (Since AB ∥ CD) (1) AP =1/2AB, CQ =1/2CD (Given) Also, AB = CD (reason) So, AP = QC (2) Therefore, APCQ is a parallelogram [From (1) and (2) and Theorem 8.8] (ii) Similarly, quadrilateral DPBQ is a parallelogram, because DQ ∥ PB and DQ = PB	1 1 1 1 2
33	Draw perpendicular OA and OB on RS and SM respectively AR=AS=16=3m OR=OS=OM=5m. (Radii of the circle) Using Pythagoras theorem, OA=4m ORSM will be a kite (OR = OM and RS = SM). We know that diagonals of a kite are perpendicular and the diagonal common to both the isosceles triangle is bisected by another diagonal  ∴∠RCS will be of 90° and RC=CM Area of ΔORS=1/2×OA×RS=1/2×RC×OS RM=2RC=2(4.8)=9.6 Therefore, the distance between Reshma and Mandip is 9.6 m. OR Let situation of Ankur, Syed and David be A, S and D respectively in the circular path. OS = OD = OA = 20m construction: Draw OM ⊥ SA  Now, AS = SD = AD So, ASD is an equilateral triangle. ∠A=60° ∠MAO=30° MO=AO/2 [In right angled triangle, the side opposite to 30° is half of hypotenuse] MO=20/2=10 $AM^2=OA^2-OM^2=20^2-10^2$ 400 - 100 = 300 AM=$\sqrt{300}$ AS=2AM=2$\sqrt{300}$ =2×10$\sqrt{300}$=20$\sqrt{300}$	
34	(a) Since the triangle is revolved about the side 12 cm, a solid cone is formed with a height of 12 cm and radius of the base of 5 cm as shown below.  Volume of a cone having radius 'r', and height 'h', = $1/3\pi r^2 h$ Radius of the cone, 'r' = 5 cm Height of the cone, 'h' = 12 cm Volume of the cone = $1/3\pi r^2 h$	 2

= 1/3 × π × 5 cm × 5 cm × 12 cm
= 100π cm^3
Volume of the cone is 100π cm^3.

(b) Since the triangle is revolved about the side 5 cm, a solid cone if formed with a height of 5 cm and radius of the base of 12 cm.



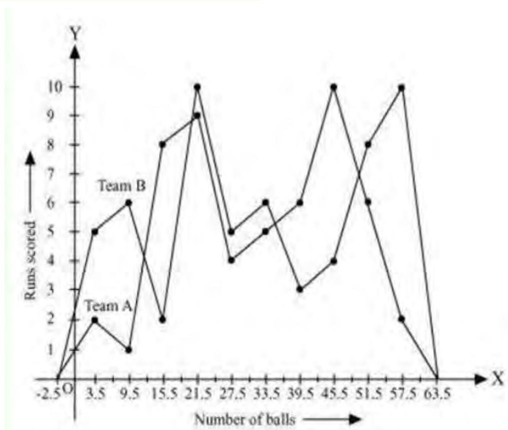
Volume of a cone having radius 'r' and height 'h' = $1/3\pi r^2h$
Radius of the cone, r =12cm
Height of the cone, h = 5cm
Volume of the cone = $1/3\pi r^2h$
= (1/3) × π × 12cm × 12cm × 5cm
= 240π cm^3 — 2

(c) Ratio = Volume of the cone in (a)/ Volume of the cone in (b)
= 100π : 240π
= 5 :12
The volume of the cone is 240π cm^3 and the required ratio is 5 :12 — 1

35 Continuous data with class mark of each class interval can be represented as follows. — 2.5+2.5

Number of balls	Class mark	Team A	Team B
0.5 - 6.5	3.5	2	5
6.5 - 12.5	9.5	1	6
12.5 - 18.5	15.5	8	2
18.5 - 24.5	21.5	9	10
24.5 - 30.5	27.5	4	5
30.5 - 36.5	33.5	5	6
36.5 - 42.5	39.5	6	3
42.5 - 48.5	45.5	10	4
48.5 - 54.5	51.5	6	8
54.5 - 60.5	57.5	2	10

By taking class marks on x-axis and runs scored on y-axis, a frequency polygon canbe constructed as follows.



36
i. (4,6) — 1
ii. (6,5) — 1
iii. (3,-6) — 2
or (-10,-3)

37
i. x+y=500 — 1
ii. x+2y=700 — 1
iii. 300 birds — 2
or 200 deers

38
i. 480 m — 1
ii. $600\sqrt{21}\ m^2$ — 1
iii. $900\sqrt{3}\ m^2$ — 2
or $300\sqrt{7}\ m^2$