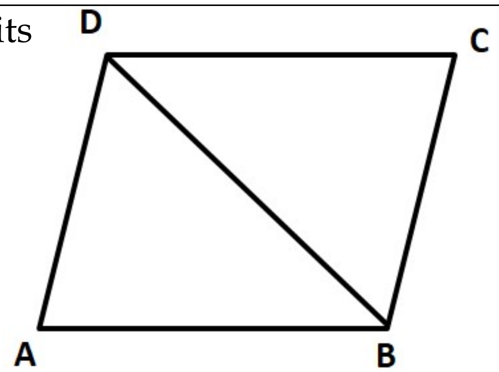
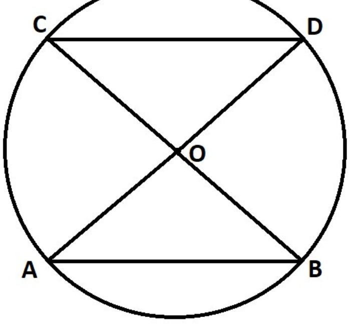
Directorate of Education, GNCT of Delhi

Solutions of Practice Paper
Class – IX
Mathematics (Code: 041)
Term – II (2021 – 2022)

Time Duration: 2 hrs. **Maximum Marks: 40**

Q. No.	Value point/Hints
1	Volume of removed water = Length X width X decrease in water level $\Rightarrow 18 = 20 \text{ X width X } 0.15$ $\therefore$ width = 6 metre OR SA of sphere = 616 $\Rightarrow 4 \text{ X } \frac{22}{7} \text{ X } r^2 = 616$ $\therefore r = 7$ cm Volume of sphere = $\frac{4}{3} \text{ X } \frac{22}{7} \text{ X } (7)^3$ $= 1437\frac{1}{3} \text{ cm}^3$
2	$2(-3) + 5 = -6 + 5 = -1$
3	Slant height= $\sqrt{(7)^2 + (24)^2} = 25$ cm Area of sheet required for a cap = CSA of the cap = $\frac{22}{7} \text{ X } 7 \text{ X } 25 = 550 \text{ cm}^2$ Area of sheet required for 10 such cap = 10 X 550 = 5500 cm^2
4	**Given:** A parallelogram ABCD & BD is its diagonal.  **To prove:** ΔABD ≅ ΔCDB **Proof:** In ΔABD and ΔCDB, AB = CD [∵ opp. sides of II^{gm}] DA = BC [∵ opp. sides of II^{gm}] BD = DB [Common] ∴ ΔABD ≅ ΔCDB (SSS rule) **Hence Proved**
5	∠BDC = ∠BAC = 30^0 (∵ angles in same segment) ∠DBC + ∠BDC + ∠BCD = 180^0 (∵ Angle sum property of ΔBCD) $\Rightarrow 70^0 + 30^0 + \angle BCD = 180^0$ $\Rightarrow \angle BCD = 80^0$ OR **Given:** AB and CD are two equal chords of a circle with centre O.  **To Prove:** ∠AOB = ∠COD **Construction:** Join AO, BO, CO and DO.

Proof: In ΔAOB and ΔCOD

AO = CO [radii of the same circle]

BO = DO [radii of the same circle]

AB = CD [Given]

$\therefore \Delta AOB \cong \Delta COD$ (SSS rule)

So, $\angle AOB = \angle COD$ (c.p.c.t.)

Hence Proved

6

Given, Surface area of sphere = Surface area of cube

$$4\pi r^2 = 6a^2$$

$$\therefore \ \frac{r}{a} = \sqrt{\frac{6}{4\pi}}$$

$$\frac{Volume\ of\ sphere}{Volume\ of\ cube} = \frac{\frac{4}{3}\pi r^3}{a^3} = \frac{4}{3}\pi\left(\frac{r}{a}\right)^3 = \frac{4}{3}\pi\left(\sqrt{\frac{6}{4\pi}}\right)^3 = \frac{4}{3}\pi \text{ X } \frac{6}{4\pi} \text{ X } \left(\sqrt{\frac{6}{4\pi}}\right) = \left(\sqrt{\frac{6}{\pi}}\right)$$

Therefore, required ratio is $\sqrt{6} : \sqrt{\pi}$.

7

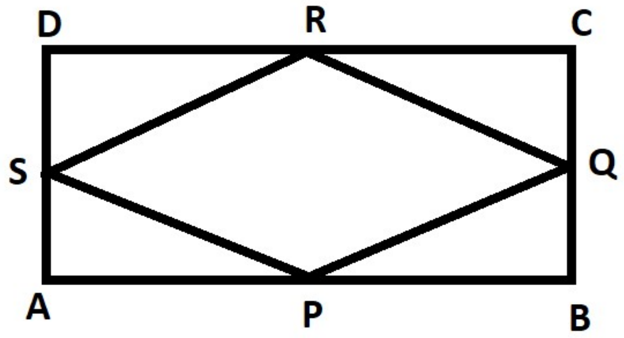
$2t^2 - t - 10$

$= 2t^2 - 5t + 4t - 10$

$= t(2t - 5) + 2(2t - 5)$

$= (2t - 5)(t + 2)$

8



ABCD is a rectangle.

$\therefore$ AB = DC & BC = AD

$\Rightarrow \frac{1}{2}$ AB = $\frac{1}{2}$ DC & $\frac{1}{2}$ BC = $\frac{1}{2}$ AD

$\therefore$ AP = PB = DR = RC &

BQ = QC = DS = AS

In ΔSAP and ΔQBP

AS = BQ [Proved above]

$\angle SAP = \angle QBP$ [each 90^0]

AP = BP [Proved above]

$\therefore \Delta SAP \cong \Delta QBP$ [SAS rule]

So, SP = PQ (c.p.c.t.) -------- ①

Similarly, PQ = QR -------- ②

QR = RS -------- ③

and RS = SP -------- ④

from ①, ②, ③ and ④, we get

PQ = QR = RS = SP

As four sides of PQRS are equal, PQRS is a rhombus.

OR

In ΔBCQ and ΔDAP

BC = DA [opp. sides of II^{gm}]

$\angle CBQ = \angle ADP$ [Alternate interior angles]

	BQ = DP [Given] ∴ ΔBCQ ≅ Δ DAP [SAS rule] So, CQ = AP [c.p.c.t.] -------- ① Similarly, PC = QA -------- ② As opp. sides of APCQ are equal So APCQ is a parallelogram.
9	Using identity $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$ $\left(\frac{1}{4}a - \frac{1}{2}b + 1\right)^2 = \left(\frac{1}{4}a\right)^2 + \left(-\frac{1}{2}b\right)^2 + (1)^2 + 2\left(\frac{1}{4}a\right)\left(-\frac{1}{2}b\right) + 2\left(-\frac{1}{2}b\right)(1) + 2(1)\left(\frac{1}{4}a\right)$ $= \frac{1}{16}a^2 + \frac{1}{4}b^2 + 1 - \frac{1}{4}ab - b + \frac{1}{2}a$
10	Radius of roller = $\frac{70}{2}$ = 35 cm Area covered in one revolution = 2 X $\frac{22}{7}$ X $\frac{35}{100}$ X 1.5 = 3.3 m^2 Area of playground = 50 X 33 = 1650 m^2 No. of revolution = $\frac{1650}{3.3}$ = 500
11	Let $p(x) = x^3 - 6x^2 + 11x - 6$ Possible factors of – 6 are ± 1, ± 2, ±3 , ±6 etc. $p(1) = (1)^3 - 6(1)^2 + 11(1) - 6 = 12 - 12 = 0$ So, x – 1 is a factor of p(x). By long division method, $p(x) = (x - 1)(x^2 - 5x + 6)$ $= (x - 1)(x^2 - 3x - 2x + 6) = (x - 1)(x - 2)(x - 3)$ OR (i) $(999)^3 = (1000 - 1)^3$ $= (1000)^3 - (1)^3 - 3(1000)(1)(1000 - 1)$ Using identity $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$ = 1000000000 – 1 – 2997000 = 997002999 (ii) 103 X 107 = (100 + 3) X (100 + 7) $= (100)^2 + (3 + 7)(100) + 3 \times 7$ Using identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ = 10000 + 2100 + 21 = 12121
12	Correct Construction
13	(i) In ΔRSO, s = $\frac{6+5+5}{2}$ = 8 cm Using Herons formulae, ar (RSO) = $\sqrt{8 \times (8-6) \times (8-5) \times (8-5)}$ =12 cm^2 Also, ar(RSO) = $\frac{1}{2}$ X SO X RE 12 = $\frac{1}{2}$ X 5 X RE

	RE = 4.8 cm Therefore, RM = 2 X RE = 2 X 4.8 = 9.6 cm (ii) In rt. angled ΔREO, $(OR)^2 = (RE)^2 + (EO)^2$ [By Pythagoras Theorem] $(5)^2 = (4.8)^2 + (EO)^2$ $EO = \sqrt{25 - 23.04} = 1.4$ cm
14	(i) $P(E) = \frac{61}{2000}$ or 0.0305 (ii) Favourable cases = 440 + 505 + 306 = 1251 $P(E) = \frac{1251}{2000}$ or 0.6255