10^{th} - CBSE

CT- 4M

Section: A

1) let the roots be: α & $1/\alpha$.

$\alpha \cdot \frac{1}{\alpha} = \frac{c}{a} \Rightarrow 1 = \frac{-K}{7}$

$\Rightarrow \boxed{K = -7}$

2) $\frac{2}{4} = \frac{5}{K}$ (∵ condition for no sol^n)

$\therefore \boxed{K = 10}$

3) $2\pi r = 22$

$\Rightarrow r = \frac{22 \times 7}{2 \times 22}$

$= 7/2$

$\rightarrow \frac{\pi r^2}{4} = \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{\cancel{7}}{2} \times \frac{7}{2} \times \frac{1}{4}$

$= 9.625$ sq. units

4) $a = 3$, $d = 5$

$a_n = 78$

$a + (n-1)d = 78$

$3 + (n-1)5 = 78$

$n-1 = \frac{75}{5}$

$n-1 = 15$

$\therefore \boxed{n = 16}$

Section: B

5) By using Euclid's division lemma, For any two positive integers, a & b ∃ q & r such that,

$a = bq + r$, $0 \leq r < b$. —(i)

by taking $b = 2$ in (i)

$a = 2q + r$, $0 \leq r < 2$.

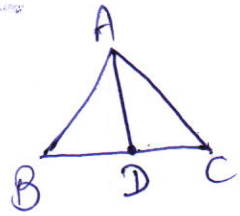
i.e. $r = 0$ or $r = 1$.

→ If, $r = 0$
$a = 2q + 0$

→ If $r = 1$ then,
$a = 2q + 1$.

∴ Any positive Integer is of the form $2q$ or $2q+1$.

6)



In ΔABC & ΔADC we have,

$\angle BAC = \angle ADC$ ∵ given

$\angle BCA = \angle DCA$ ∵ common angle

∴ By AA- similarity criterion we have,

$\Delta ABC \sim \Delta DAC$

∴ By, $\frac{CA}{CD} = \frac{CB}{CA}$ ∵ Similarity of two triangles.

∴ $\boxed{CA^2 = CB \cdot CD}$

7)

Classes	65-85	85-105	105-125	125-145	145-165	165-185
freq.	4	5	13	20	14	12
Cumulative freq.	4	9	22	42	56	68

$N = 68$

$\frac{N}{2} = 34$

∴ median class = 125-145

∴ Upper limit of median class = 145

→ modal class = 125-145

∴ lower limit of modal class = 125.

→ ∴ Difference of U.L. of median class & L.L. of modal class

$= 145 - 125$
$= 20.$

8) Since, the lengths of tangents drawn from an external point to a circle are equal.

$\therefore AQ = AR$ ∵ tangents from A

$BP = BQ$ ∵ tangents from B

$CP = CR$ ∵ tangents from C

Now, Perimeter of ΔABC

$= AB + BC + AC$

$= AB + BP + CP + AC$

$= AB + BQ + CR + AC$ ∵ from (ii) & (iii)

$= AQ + AR$ ∵ from (i)

$= 2AQ = 2AR$

$\therefore AR = AQ = \frac{1}{2}$ (Perimeter of ΔABC).

9) $a_n = 2n^2 + 1$

$a_1 = 3$

$a_2 = 9$

$a_3 = 19$

$d = a_2 - a_1 = 9 - 3 = 6$

$d = a_3 - a_2 = 19 - 9 = 10$

Here, common difference is not same.

$\therefore$ The given sequence is not A.P.

10) (i) There are 2 red kings in 52 cards' pack

$\therefore \frac{2}{52} = \frac{1}{26}$

(ii) 4 queens & 4 jacks are there in a pack of 52 cards.

$\therefore$ probability of getting a queen or a jack $= \frac{8}{52}$

$= \frac{2}{13}.$

11) If possible suppose, $\sqrt{3}$ is a rational no.

$\sqrt{3} = \frac{a}{b}$ where, a & b are coprimes.

i.e. $\sqrt{3}b = a$

Squaring on both the sides,

$3b^2 = a^2$ —(i)

$\Rightarrow$ 3 divides a^2.

$\Rightarrow$ 3 divides a —(ii)

$\therefore$ let $a = 3m$.

from (i)

$3b^2 = 9m^2$

$\therefore b^2 = 3m^2$

$\Rightarrow 3 \mid b^2$

$\Rightarrow$ 3 divides b. —(iii)

→ from (ii) & (iii), 3 is a factor of a & b both.

This contradicts the fact that a & b are coprimes.

$\therefore$ our supposition is false.

$\therefore \sqrt{3}$ is an irrational number.

12) In ΔOPQ, $AB \parallel PQ$.

$\Rightarrow \frac{OA}{AP} = \frac{OB}{BQ}$. —(i)

→ In ΔOPR we have, $AC \parallel PR$

$\Rightarrow \frac{OC}{CR} = \frac{OA}{AP}$ —(ii)

→ From (i) & (ii)

$\frac{OB}{BQ} = \frac{OC}{CR}$

$\therefore$ By using converse of BPT we have, $BC \parallel QR$.