Code Number: **A**

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Time: 3 hrs. **Mock Test Paper for Class-XII** **Max. Marks: 75**

MATHEMATICS

Paper - II(A)

Answers & Solutions

1. Answer

$Z = 7 + 24i$

$$\frac{1}{Z} = \frac{1}{7+24i} = \frac{1}{7+24i} \times \frac{7-24i}{7+24i} = \frac{7-24i}{625} = \frac{7}{625} - \frac{24i}{625}$$

2. Answer

$Z_1 = -i = \cos\pi + i\sin\pi$ Arg $Z_1 = \pi$, $Z_2 = i = \cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$

Arg = $Z_2 = \frac{\pi}{2}$

Arg = $\left(\frac{Z_1}{Z_2}\right) = \text{Arg}Z_1 - \text{Arg}Z_2 = \pi - \frac{\pi}{2} = \frac{\pi}{2}$

3. Answer

$$\left(1-\omega+\omega^2\right)^6 + \left(1+\omega-\omega^2\right)^6$$

$$= \left(-\omega-\omega\right)^6 + \left(-\omega^2-\omega^2\right)^6$$

$$= \left(-2\omega\right)^6 + \left(-2\omega^2\right)^6$$

$$= 2^6(\omega^6 + \omega^{12}) = 2^6(1+1) = 2^7 = 128$$

4. Answer

$$\frac{1}{\alpha^2} + \frac{1}{\beta^2}$$

$$\frac{\beta^2+\alpha^2}{\alpha^2\beta^2} + \frac{(\alpha+\beta)^2 - 2\alpha\beta}{(\alpha\beta)^2} = \frac{\left(-\frac{b}{a}\right)^2 - 2\frac{c}{a}}{\left(\frac{c}{a}\right)^2} = \frac{b^2-2ac}{c^2}$$

5. Answer

$\alpha\beta\gamma = 9$

$\frac{a}{4} = 9$

$a = 36$

6. Answer

$n = 6$

$\frac{(n-1)!}{2} = \frac{5!}{2} = 60$

7. Answer

$r + 1 = 3r - 5$	$r + 1 + 3r - 5 = 12$
$2r = 6$	$4r = 16$
$r = 3$	$r = 4$

8. Answer

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

$\left|\frac{3}{2}x\right| < 1$

$|x| < \frac{2}{3}$

$(x) \epsilon \left(\frac{-2}{3}, \frac{2}{3}\right)$

9. Answer

$\bar{X} = \frac{500}{10} = 50$

Mean derivation from Mean

$\frac{\Sigma|x_i - \bar{X}|}{n} = \frac{12 + 20 + 2 + 10 + 8 + 5 + 13 + 4 + 4 + 6}{10} = \frac{84}{10} = 8.4$

10. Answer

$n = 10, P = 0.1, q = 0.9$

$PP(X = 1) = 10C_1 (0.1)^1 \times (0.9)^9 = (0.9)^9$

11. Answer

Let , $y = \frac{x}{x^2 - 5x + 9} \Rightarrow x^2y - 5xy + 9y = x$

$\Rightarrow x^2y - 5xy + 9y - x = yx^2 + (-5y - 1)x + 9y = 0$

It is in the form of $ax^2 + bx + c = 0$, where $a = y$, $b = -5y - 1$, $c = 9y$

Since, 'x' is real $\Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0$

$\Rightarrow \left[-(5y + 1)\right]^2 - 4y(9y) \geq 0 \qquad \Rightarrow 25y^2 + 1 + 10y - 36y^2 \geq 0 \Rightarrow -11y^2 + 10y + 1 \geq 0$

$\Rightarrow 11y^2 - 10y - 1 \leq 0 \qquad \Rightarrow 11y^2 - 11y + y - 1 \leq 0$

$\Rightarrow (y-1)(11y+1) \leq 0 \Rightarrow \frac{-1}{11} \leq y \leq 1$

i.e 'y' lies in between $\frac{-1}{11}$ and 1

Hence, the given expression lies between $\frac{-1}{11}$ and 1

12. Answer

Let $A = (-2+7i) = (-2-7), B = \left(\frac{-3}{2} + \frac{1}{2}i\right) = \left(\frac{-3}{2}, \frac{1}{2}\right),$

$C = (4-3i) = (4,-3), D = \frac{7}{2}(1+i) = \left(\frac{7}{2}, \frac{7}{2}\right),\ \overline{AB} = \sqrt{\left(\frac{-3}{2}+2\right)^2 + \left(\frac{1}{2}-7\right)^2} = \sqrt{\frac{1}{4} + \frac{169}{4}} = \sqrt{\frac{170}{4}}$

[$\because$ The distance between the two point (x_1, y_1) and (x_2, y_2) is $\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$]

$\overline{BC} = \sqrt{\left(4+\frac{3}{2}\right)^2 + \left(-3-\frac{1}{2}\right)^2} = \sqrt{\frac{121}{4} + \frac{49}{4}} = \sqrt{\frac{170}{4}}$; $\quad \overline{CD} = \sqrt{\left(\frac{7}{2}-4\right)^2 + \left(\frac{7}{2}-3\right)^2} = \sqrt{\frac{1}{4} + \frac{169}{4}} = \sqrt{\frac{170}{4}}$

$\overline{DA} = \sqrt{\left(-2-\frac{7}{2}\right)^2 + \left(7-\frac{7}{2}\right)^2} = \sqrt{\frac{121}{4} + \frac{49}{4}} = \sqrt{\frac{170}{4}}$;

$\overline{AC} = \sqrt{(4+2)^2 + (-3-7)^2} = \sqrt{36+100} = \sqrt{136}$;

$\overline{BD} = \sqrt{\left(\frac{7}{2}+\frac{3}{2}\right)^2 + \left(\frac{7}{2}-\frac{1}{2}\right)^2} = \sqrt{\frac{100}{4} + \frac{36}{4}} = \sqrt{\frac{136}{4}}$;

$\because \overline{AB} = \overline{BC} = \overline{CD} = \overline{DA}$ and $\overline{AC} \neq \overline{BD}$

Small, all the four sides are equal in length and diagonals are not equal in length $\Rightarrow$ the given points from a rhombus.

13. The dictionary order of the letters of the word MASTER is A, E, M, R, S, T

No of words that begin with A = 5 !

No of words that begin with E = 5 !

No of words that begin with MAE = 3 !

No of words that begin with MAR = 3 !

No of words that begin with MASE = 2 !

No of words that begin with MASR = 2 !

No of words that begin with MASTER = 0! = 1

Rank of word MASTER = 5!+5!+3!+3!+2!+2!+1 = 120+120+6+6+5 = 257

14. L.H.S = $\frac{4n_{C_{2n}}}{2n_{C_n}} = \frac{\left[(4n!)/((4n-2n)!2n!)\right]}{\left[(2n!)/((2n-n)!n!)\right]} = \frac{\left[(4n!)/(2n!2n!)\right]}{\left[(2n!)/n!n!)\right]} = \frac{4n!}{(2n!)^2} \times \frac{4n!}{(2n!)^2}\left[\because n_{C_r} = \frac{n!}{(n-r)!r!}\right]$

$= \frac{4n(4n-1)(4n-2).....5.4.3.2.1}{(2n(2n-1)(2n-2)...5.4.3.2.1)^2} \times \frac{(n!)^2}{(2n!)}$

$$=\frac{(4n-1)(4n-3)\ldots..5\ .3..1\left[4n(4n-2)\ldots4.2\right]}{\left((2n-1)(2n-3)\ldots5..3.1\right)^2\left[2n(2n-2)\ldots4.2\right]^2}\times\frac{(n!)^2}{(2n!)}$$

$$=\frac{(4n-1)(4n-3)\ldots..5\ .3..1\left[2^{2n}(2n)(2n-2)\ldots2.1)\right]}{\left((2n-1)(2n-3)\ldots5..3.1\right)^2 2^{2n}.[n(n-1)\ldots(2.1)\ \ ]^2}\times\frac{(n!)^2}{(2n!)}$$

$$=\frac{\left[(4n-1)(4n-3)\ldots..5\ .3..1\right].(2n!)}{\left((2n-1)(2n-3)\ldots5..3.1\right)^2(n!)^2}\times\frac{(n!)^2}{(2n!)}$$

$$=\frac{\left[(4n-1)(4n-3)\ldots..5\ .3..1\right])}{\left((2n-1)(2n-3)\ldots5..3.1\right)^2}=\frac{1.3.5\ldots.(4n-3)(4n-1)}{\left[1.3.5\ldots.(2n-3)(2n-1)\right]^2}=\text{R.H.S.}$$

15. Answer

Let , $x-1=t\Rightarrow x=1+t$

Now, $\frac{3x^3-8x^2+10}{(x-1)^4}=\frac{3(1+t)^3+8(1+t)^2+10}{t^4}=\frac{3\left(1+t^3+3t^2+3t\right)-8\left(1+t^2+2t\right)+10}{t^4}$

$$=\frac{3+3t^3+9t^2-8-8t^2-16t+10}{t^4}=\frac{3t^3+t^2-7t+5}{t^4}=\frac{3}{t}+\frac{1}{t^2}-\frac{7}{t^3}+\frac{5}{t^4}$$

$$\therefore\frac{3x^3-8x^2+10}{(x-1)^4}=\frac{3}{x-1}+\frac{1}{(x-1)^2}-\frac{7}{(x-1)^3}+\frac{5}{(x-1)^4}$$

16. Given that A, B, C are three horses.

Let P(A), P(B), P(C) be the probabilities of winning the horses A, B, C respectively.

Given P(A) = 2P(B) ---(1) and P(B) = 2P(C) ---(2)

P(A) + P(B)+ P(C)= 1

2 P(B) + P(B)+ P(C)= 1

3 P(B) + P(C)= 1

6P(C)+ P(C)= 1

P(C)= 1/7

P(B)= 2/7

P(A)= 4/7

17. Given that, $P\left(A\cap\bar{B}\cap\bar{C}\right)=\frac{1}{4}$____(1) ; $P\left(\bar{A}\cap\bar{B}\cap\bar{C}\right)=\frac{1}{8}$____(2) &$P\left(\bar{A}\cap\bar{B}\cap\bar{C}\right)=\frac{1}{4}$______(3)

Now, $\frac{(2)}{(3)}\Rightarrow\frac{P\left(\bar{A}\cap\bar{B}\cap\bar{C}\right)}{P\left(\bar{A}\cap\bar{B}\cap\bar{C}\right)}=\frac{1/8}{1/4}=\frac{1}{2}\Rightarrow\frac{P(B)}{P(B)}=\frac{1}{2}\Rightarrow 2P(B)=P\left(\bar{B}\right)$

[$\because$ If A, B, C are independent events, then $P(A\cap B\cap C)=P(A).P(B).P(C)$]

$\Rightarrow 2P(B)=1-P(B)\Rightarrow 3\left[P(B)\right]=1\Rightarrow P(B)=\frac{1}{3}$

Again, $\frac{(1)}{(3)}=\frac{P\left(A\cap\bar{B}\cap\bar{C}\right)}{P\left(\bar{A}\cap\bar{B}\cap\bar{C}\right)}=\frac{1/4}{1/4}=1\Rightarrow\frac{P(A)}{P(A)}=1\Rightarrow P(A)=P\left(\bar{A}\right)$

$\Rightarrow P(A)=1-P(A)=2P(A)=1\Rightarrow P(A)=\frac{1}{2}$

From eq.(3); $P(\bar{A})P(\bar{B})P(\bar{C}) = \frac{1}{4} \Rightarrow [1-P(A)][1-P(B)][(1-P(C)] = \frac{1}{4}$

$\Rightarrow \frac{1}{2}\left(\frac{2}{3}\right)[1-P(C)] = \frac{1}{4} \Rightarrow 1-P(C) = \frac{3}{4} \Rightarrow P(C) = 1-\frac{3}{4} \Rightarrow P(C) = \frac{1}{4}$

$\because P(A) = \frac{1}{2}, P(B) = \frac{1}{3}, P(C) = \frac{1}{4}$

18. Given that $\cos\alpha + \cos\beta + \cos\gamma = \sin\alpha + \sin\beta + \sin\gamma = 0$

Now, $(\cos\alpha + i\sin\alpha) + (\cos\beta + i\cos\beta) + (\cos\gamma + i\sin\gamma) = (\cos\alpha + \cos\beta + \cos\gamma) = i(\sin\alpha + \sin\beta + \sin\gamma) = 0 + i0$

$\Rightarrow (\cos\alpha + i\sin\alpha) + (\cos\beta + i\cos\beta) + (\cos\gamma + i\sin\gamma) = 0 \ldots\ldots..(1)$

Let , $x = cis\alpha, y = cis\beta, z = cis\gamma$ then $x + y + z = 0$ [by eq.(1)]

By squaring on both side $(x+y+z)^2 = 0 \Rightarrow x^2 + y^2 + z^2 = 2(xy + yz + zx) = -2xyz\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right)$

$= -2xyz[\cos\alpha - i\sin\alpha + \cos\beta - i\sin\beta + \cos\gamma]$

$= -2xyz[\cos\alpha + \cos\beta + \cos\gamma] - i[\sin\alpha + \sin\beta + \sin\gamma] = -2xyz(0 - i0)$ ($\because$ from given)

$\therefore x^2 + y^2 + z^2 = 0$

$\Rightarrow (\cos\alpha + i\sin\alpha)^2 + (\cos\beta + i\sin\beta)^2 + (\cos\gamma + i\sin\gamma)^2 = 0$

19. Answer

Given equation is $6x^6 - 25x^5 + 31x^4 - 31x^2 + 25x - 6 = 0$ …..(1)

Now, by comparing the given equation $a_0x^n + a_1x^{n-1} + a_2x^{n-2} + \ldots.. + a_n = 0$

We get $a_0 = 6, a_1 = 25, a_2 = 31, a_3 = -31, a_4 = 25, a_5 = -6.$

The degree of the given equation is $n = 6$, which is even

Also $a_k = a_n - k \,\forall k = 0,1,2,3,4,5,6.$

Hence the given equation is a reciprocal equation of class-II of even degree .

Hence 1, –1 are the roots of $6x^6 - 25x^5 + 31x^4 - 31x^2 + 25x - 6 = 0$

$\therefore$ By Horner' s synthetic division, we get

-1	6	-25	31	0	-31	25	-6
	0	-6	31	-62	62	-31	6
1	6	-31	62	-62	-31	-6	0
	0	6	-25	37	-25	6	
	6	-25	37	-25	6	0	

The reduced equation is $6x^4 - 25x^3 + 37x^2 - 25x + 6 = 0$ …. (2)

Clearly, eq. (2) is an even degree reciprocal equation of class- I by dividing eq. (2) with x^2 .

We get $6x^2 - 25x + 37 - 25\frac{1}{x} + \frac{6}{x^2} = 0 \Rightarrow x^2 + \frac{1}{x^2} = a^2 - 2.$

From eq. (3). We get $6(a^2 - 2) - 25a + 37 = 0 \Rightarrow 6a^2 - 12 - 25a + 37 = 0 \Rightarrow 6a^2 - 25a + 25 = 0$

$\Rightarrow 6a^2 - 15a - 10a + 25 = 0 \Rightarrow 3a(2a-5) - 5(2a-5) = 0$

$\Rightarrow (2a-5)(3a-5) = 0 \Rightarrow a = \frac{5}{2} (\text{or}) \; a = \frac{5}{3}.$

Case – I : if $a = \frac{5}{2}$ then $x + \frac{1}{x} = a \Rightarrow x + \frac{1}{x} = \frac{5}{2} \Rightarrow \frac{x^2+1}{x} = \frac{5}{2}$

$\Rightarrow 2x^2 + 2 = 5x \Rightarrow 2x^2 - 5x + 2 = 0 \Rightarrow 2x^2 - 4x - x + 2 = 0$

$\Rightarrow 2x(x-2) - 1(x-2) = 0 \Rightarrow (x-2)(2x-1) = 0 \Rightarrow x = 2 (\text{or}) x = \frac{1}{2}.$

Case- II : if a = $\frac{5}{3}$, Then $x + \frac{1}{x} = a \Rightarrow x + \frac{1}{x} = \frac{5}{3} \Rightarrow \frac{x^2+1}{x} = \frac{5}{3}$

$\Rightarrow 3x^2 + 3 = 5x \Rightarrow 3x^2 - 5x + 3 = 0$

$\Rightarrow x = \frac{5 \pm \sqrt{25 - 4(3)(3)}}{2(3)} \Rightarrow x = \frac{5 \pm \sqrt{25-36}}{6} \Rightarrow x = \frac{5 \pm i\sqrt{11}}{6} \left[\because x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$

$\therefore -1, 1, 2, \frac{1}{2}, \frac{5 \pm i\sqrt{11}}{6}$ are the roots of given equation.

20. Answer

Given equation is $(a+x)^n$.

2nd term $T_2 = T_{1+1} = {}^nC_1.(a)^{n-1}.(x)^1 = 240$ … (1)

($\because$ Generalterm in $(a+x)^n$ is $T_{r+1} = {}^nC_1.(a)^{n-r}.(x)^r$)

3rd Term $T_3 = T_{2+1} = {}^nC_2.(a)^{n-2}.(x)^2 = 720$ … (2)

4th Term $T_4 = T_{3+1} = {}^nC_3.(a)^{n-3}.(x)^3 = 1080$ … (3)

Now $\frac{eq(2)}{eq(1)} \Rightarrow \frac{{}^nC_2.(a)^{n-2}.(x)^2}{{}^nC_1.(a)^{n-1}.(x)^1} = \frac{720}{240} = 3 \Rightarrow \frac{n-1}{2} \times a^{-1}.x = 3$

$$\Rightarrow \left(\frac{n-2}{3}\right)\left(\frac{x}{a}\right) = 3 \Rightarrow \frac{x}{a} = \frac{9}{2(n-2)} \ldots.(5)$$

From equation (4) and (5), we get $\frac{6}{n-1} = \frac{9}{2(n-2)} \Rightarrow \frac{2}{n-1} = \frac{3}{2(n-1)}$

$$\Rightarrow 4n - 8 = 3n - 3 \Rightarrow n = 5$$

From (4) $\Rightarrow \frac{x}{a} = \frac{6}{5-1} \Rightarrow \frac{x}{a} = \frac{6}{4} = \frac{3}{2} \Rightarrow x = \frac{3a}{2} \ldots.(6)$

By substituting the values of x, n in equation (1) , we get ${}^5C_1(a)^{5-1}\left[\frac{3a}{2}\right] = 240$

$\Rightarrow a^5 = 32, \Rightarrow a^5 = 2^5 \Rightarrow a = 2$

By substituting a = 2 in equation (6), we get x = $\frac{6}{2} = 3$

$\therefore a = 2, x = 3, n = 5.$

21. Answer

Given that, $x = \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + + \frac{1.3.5.7}{3.6.9.12} + \ldots\ldots = \frac{1.3}{1.2}\left(\frac{1}{3}\right)^2 + \frac{1.3.5}{1.2.3}\left(\frac{1}{3}\right)^3 + \ldots\ldots$

By adding $1+\frac{1}{3}$ on both sides, $1+\frac{1}{3}+x = 1+\frac{1}{1!}\left(\frac{1}{3}\right)+\frac{1.3}{2!}\left(\frac{1}{3}\right)^2+\ldots$

Now R.H.S is of the form $1+\frac{p}{1!}\left(\frac{x}{q}\right)+\frac{p(p+q)}{2!}\left(\frac{x}{q}\right)^2+\ldots..$

Where $p=1, p+q=3 \Rightarrow q=2$,and $\frac{x}{q}=\frac{1}{3} \Rightarrow x=\frac{2}{3}$

$$\left[\because 1+\frac{p}{1!}\left(\frac{x}{q}\right)+\frac{p(p+q)}{2!}\left(\frac{x}{q}\right)^2+\ldots=(1-x)^{-p/q}\right]$$

$$\Rightarrow 1+\frac{1}{3}+x=\left(1-\frac{2}{3}\right)^{-1/2} \Rightarrow \frac{4}{3}+x=\left(\frac{1}{3}\right)^{-1/2}=\sqrt{3} \Rightarrow 3x+4=3\sqrt{3}$$

By squaring on both sides, $(3x+4)^2=\left(3\sqrt{3}\right)^2$

$$9x^2+16+24x=27 \Rightarrow 9x^2+24x=11$$

22. Answer

We taken the assumed mean A= 65. Here C = 10, then $d_i=\frac{x_i-65}{10}$.

Now, we construct the table with given data.

Class Intervals (C.I)	Frequency (f_i)	Mid point of C.I (x_i)	$d_i=\frac{x_i-65}{10}$.	d_i^2	$f_i d_i$	$f_i d_i^2$
30-40	3	35	-3	9	-9	27
40-50	7	45	-2	4	-14	28
50-60	12	55	-1	1	-12	12
60-70	15	65	0	0	0	0
70-80	8	75	1	1	8	8
80-90	3	85	2	4	6	12
90-100	2	95	3	9	6	18
	$\sum f_i = N = 50$				$\sum f_i d_i = -15$	$\sum f_i d_i^2 = 105$

Here, N = 50, $\sum f_i d_i = -15, \sum f_i d_i^2 = 105$

$$\bar{X} = A + \left(\frac{\sum f_i d_i}{N}\right) \times h$$

= 65 -3 = 62

Variance $\sigma^2 = C^2\left[\frac{\sum f_i d_i}{N} - \left(\frac{\sum f_i d_i}{N}\right)^2\right]$

$= 10^2\left[\frac{105}{50} - \left(\frac{-15}{50}\right)^2\right] = 100\left[\frac{105}{50} - \frac{225}{2500}\right] = 100\left[\frac{(105)(50)-225}{2500}\right] = \frac{100(5025)}{2500}$ = 201

Standard deviation $(\sigma_x) = \sqrt{201} = 14.18$ (approximately)

23. Answer

Given that,

Box	White	Black	Red	Total No. Of Balls
I	1	2	3	6
II	2	1	1	4
III	4	5	3	12

Let B_1, B_2, B_3 be a events of selecting the boxes I, II, III respectively.

$\therefore P(B_1) = \frac{1}{3}, P(B_2) = \frac{1}{3}, \quad P(B_3) = \frac{1}{3}$.

Let , 'R' be an event of drawing a red ball from a box.

$\therefore P(R/B_1) = \frac{3}{6} = \frac{1}{2}, P(R/B_2) = \frac{1}{4}, \quad P(R/B_3) = \frac{3}{12} = \frac{1}{4}$

$\therefore$ The probability that the red from box- II is

[$\because$ by Baye's theorem]

$$P(B_2/R) = \frac{P(B_2)P(R/B_2)}{P(B_1)P(R/B_1) + P(B_2)P(R/B_2) + P(B_3)P(R/B_3)}$$

$$= \frac{\frac{1}{3}\cdot\frac{1}{4}}{\frac{1}{3}\cdot\frac{1}{2} + \frac{1}{3}\cdot\frac{1}{4} + \frac{1}{3}\cdot\frac{1}{4}} = \frac{\frac{1}{3}\cdot\frac{1}{4}}{\frac{1}{3}\left(\frac{1}{2} + \frac{1}{4} + \frac{1}{4}\right)} = \frac{\frac{1}{4}}{\frac{2+1+1}{4}} = \frac{1}{4}$$

24. Answer

Given,

$X = x_i$	0	1	2	3	4	5	6	7
$P(X = x_i)$	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2 + k$

i) We have $\sum_{i=0}^{7} x_i = P(X = x_i) = 1$

[$\because$ Sum of the probabilities is 1]

$\Rightarrow 0 + k + 2k + 3k + k^2 + 2k^2 + 7k^2 + k = 1 \Rightarrow 10k^2 + 9k - 1 = 0 \Rightarrow 10k^2 - k - 1 = 0$

$\Rightarrow 10k(k+1) - 1(k+1) = 0 \Rightarrow (k+1)(10k-1) = 0 k = \frac{1}{10}$

ii) Mean $(\mu) = \sum_{i=0}^{7} P(X = x_i)$

$$\Rightarrow 0(0)+1k+2(2k)+3(2k)+4(3k)+5(k^2)+6(2k^2)+7(7k^2+k)$$

$$\Rightarrow 0+4k+6k+12k+5k^2+12k^2+49k^2+7k=66k^2+30k$$

$$=66\left(\frac{1}{100}\right)+30\left(\frac{1}{10}\right)=\frac{66}{100}+\frac{300}{100}=\frac{366}{100}=3.66$$

iii) $P(0<X<5)=P(X=1)+P(X=2)+P(X=3)+P(X=4)$

$$=k+2k+2k+3k=8k=8\left(\frac{1}{10}\right)=\frac{4}{5}$$