



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Second Semester – Spring 2022

Paper: Elementary Mathematics-I (Algebra)

Course Code: MATH-111

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following Questions.

(6x5=30)

(i) If $\frac{1}{k}, \frac{1}{2k+1}, \frac{1}{4k-1}$ are in H.P. find k.

(ii) Solve the system of linear equations by Cramer's rule

$$2x_1 - x_2 + x_3 = 8$$

$$x_1 + 2x_2 + 2x_3 = 6$$

$$x_1 - 2x_2 - x_3 = 1$$

(iii) Solve the system of equations

$$x^2 - 5x + 6y^2 = 0, x^2 + y^2 = 45$$

(iv) Find the 6th term in the expansion of $(x^2 - \frac{3}{2x})^{10}$

(v) Expand by binomial theorem of $(2 + x - x^2)^4$

(vi) Prove that $\sec^2 \theta - \operatorname{cosec}^2 \theta = \tan^2 \theta - \cot^2 \theta$

Solve the following.

(3x10=30)

Q.2 (a) Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$

(b) Show that $\begin{vmatrix} a+l & a & a \\ a & a+l & a \\ a & a & a+l \end{vmatrix} = l^2(3a+l)$

Q.3 (a) If A and B are non-singular matrices, then show that $(AB)^{-1} = B^{-1}A^{-1}$.
(b) Define a reciprocal equation and give an example.

Q.4 (a) Express the complex number $z = 1 + i\sqrt{3}$ in polar form.

(b) Simplify $(-\frac{1}{2} + \frac{\sqrt{3}}{2}i)^3$



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- (iii) Solve the system of equations
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