

Unit 1: 15 points

1. (3 points) Solve $|4x - 1| = -x + 2$
- 2.(a) (2 points) **Graph** the solution of the system

$$\begin{cases} y > -x + 1 \\ 2x - 3y > 8 \end{cases}$$

- (b) (2 points) find the intersection
- (c) (2 points) Identify if (1, 0) is a solution of the system?
3. (6 points) Solve the system below:

$$\begin{cases} 2x - y - z = -\frac{1}{4} \\ x + z = \frac{3}{2} \\ 2y - z = -\frac{1}{2} \end{cases}$$

Unit 2: 15 points

[Read this before you proceed]Unless otherwise mentioned in the questions, all unknowns in unit 2 can be complex numbers.

imaginary unit is defined as $i = \sqrt{-1}$.

4. (2 points) Solve the quadratic equation by factoring, **(if using any other method, no point will be given)**

$$8x^2 + 14x - 15 = 0$$

5. (2 points) Solve the quadratic equation by completing the square, **(if using any other method, no point will be given)**

$$2x^2 - 8x + 9 = 0$$

6. Given $z_1 = i - 1$, $z_2 = -2 + 3i$

Find

- (a) (2 points) $z_1 z_2$

- (b) (2 points) $\frac{z_1}{z_2}$

- (c) (1 points) $\left| \frac{z_1}{z_2} \right|$

- 7.(6 points) **Graph** $y = \frac{1}{2}x^2 + 2x - 4$, identify

the following characteristics of the function:

- (i) opening (ii)axis of symmetry (iii) coordinates of the vertex (iv) x- intercepts (v) y-intercept

Unit 3: 30 points

8. Factor following polynomials completely:

- (a) (4 points) $(x + 3)^2 - 3x(x + 3)$

- (b) (2 points) $x^3 + 4x^2 - 16x - 64$

9. (4 points) Use long division to find quotient and remainder of

$$(x^4 - 2x^3 + x + 1) \div (x^2 - x + 1)$$

10. Given $f(x) = 4x^3 + 2ax^2 + 3bx - 9$. If $(x-3)$ is a factor of $f(x)$ and the remainder of $f(x) \div (x - 2)$ is -23,

- (a) (8 points) Find a, b?

- (b) (6 points) Factor $f(x)$ completely?

- (c) (2 points) $f(-1)$

11. (4 points) Solve for x and y, if

$$3 \cdot 5^{x+2} = 75^{y-2}$$