

PART B

1. Solve for x in each of the following, $x \in C$.

a) $x^3 - 25x = 0$

b) $x^4 - 26x^2 + 25 = 0$

c) $x^3 + 6x^2 + 10x + 4 = 0$

d) $x^3 + 27 = 0$

e) $x^3 + 2x^2 - 3x = 0$

f) $x^4 - 3x^3 - 15x^2 - 16x - 12 = 0$

2. Sketch each polynomial then solve for the indicated range.

a) $f(x) = 5(x+2)(x-4)$; $f(x) > 0$

b) $f(x) = (2-3x)(5x+4)^2$; $f(x) \geq 0$

c) $f(x) = (2x+3)(x+5)(x-4)$; $f(x) \leq 0$

d) $f(x) = (2-x)(3-x)(4-x)$; $f(x) > 0$

e) $f(x) = -(3x-1)(x+2)(x-3)^2$; $f(x) < 0$

f) $f(x) = (5-2x)^3(x+2)^2$; $f(x) \leq 0$

3. Solve each of the following using a number line, $x \in \mathfrak{R}$.

a) $2x^2 - x - 15 \geq 0$

b) $x^3 + 5x^2 - 6x > 0$

c) $x^3 + 4x^2 - 11x - 30 \leq 0$

d) $x^4 - 13x^2 + 36 < 0$

e) $x^4 - 19x^2 + 6x + 72 \leq 0$

Answers:

1. a) 0, 5, -5 b) -1, 1, -5, 5 c) -2, $-2 \pm \sqrt{2}$ d) -3, $\frac{3 \pm 3\sqrt{3}i}{2}$ e) -3, 0, 1 f) -2, 6, $\frac{-1 \pm 3\sqrt{3}i}{2}$
2. a) $x < -2$ or $x > 4$ b) $x \leq \frac{2}{3}$ c) $x \leq -5$ or $-\frac{3}{2} \leq x \leq 4$
 d) $x < 2$ or $3 < x < 4$ e) $x < -2$ or $\frac{1}{3} < x < 3$ or $x > 3$ f) $x = -2$ or $x \geq \frac{5}{2}$
3. a) $x \leq -\frac{5}{2}$ or $x \geq 3$ i) $-6 < x < 0$ or $x > 1$ k) $x \leq -5$ or $-2 \leq x \leq 3$
 o) $-3 < x < -2$ or $2 < x < 3$ r) $-4 \leq x \leq -2$ or $x = 3$