

King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (001)-Term (181)
Recitation (3. 4)

Question 1: According to Descartes rule of signs, which of the following is **false** about the zeros of $P(x) = x^5 - x^4 + 2x^2 - x - 1$

- (a) $P(x)$ has three negative zeros and two nonreal complex zeros.
- (b) $P(x)$ has three positive zeros and two negative zeros.
- (c) $P(x)$ has three positive zeros and two nonreal complex zeros.
- (d) $P(x)$ has one positive zero, two negative zeros, and two nonreal complex zeros.
- (e) $P(x)$ has one positive zero and four nonreal complex zeros.

Answer: (a): is false because it has either 2 negative zeros or no negative real zero

Question 2: Find all rational zeros of the polynomial

$P(x) = x^5 - 4x^4 - 3x^3 + 22x^2 - 4x - 24$, and write it in factored form.

Answer: zeros : $-1, \pm 2$, and 3. $P(x) = (x - 2)^2(x - 3)(x + 1)(x + 2)$

Question 3: The sum of all real zeros of the polynomial

$P(x) = 2x^4 + 15x^3 + 17x^2 + 3x - 1$ is

- (a): $-3 + \sqrt{10}$ (b): $-\frac{3}{2}$ (c): $-\frac{15}{2}$ (d): $-3 - \sqrt{10}$ (e): -7

Answer: (c): $-\frac{15}{2}$

Question 4: The total number of x-intercepts of the polynomial

$P(x) = x^5 + 6x^4 + 13x^3 + 14x^2 + 12x + 8$ is (are)

- (a) 0 (b) 1 (c) 2 (d) 3 (e) 4

Answer: (b) 1

Question 5: List all possible rational zeros given by the Rational Zeros Theorem, for the following polynomial: $P(x) = 12x^5 + 6x^3 - 2x - 8$

Answer: $\pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{4}{3}, \pm \frac{8}{3}, \pm \frac{1}{4}, \pm \frac{1}{6}, \pm \frac{1}{12}$.