

Work on as many problems as you can together with your group members. Towards the end of lecture your group will be asked to present problems correctly to receive classwork points.

1. Use the leading coefficient test to determine the end behavior of the graph of the given polynomial function.

(a) $f(x) = 7x^5 + 2x^2 - 5x + 3$

(b) $f(x) = 6x^4 + 5x^2 - x + 7$

(c) $f(x) = -7x^4 + 4x^2 - 3x + 5$

(d) $f(x) = -3x^5 + 5x^2 + x + 2$

(e) $f(x) = -4x^4 + 3x^3 - x + 5$

2. Find the zeros for the polynomial function and give the multiplicity for each zero. State whether the graph crosses the x-axis, or touches the x-axis and turns around, at each zero.

(a) $f(x) = 6(x + 8)(x - 5)^2$

(b) $f(x) = 6(x - 4)(x - 3)^3$

(c) $f(x) = 9(x + 3)(x - 6)^2$

(d) $f(x) = 4(x + 5)(x - 6)^3$

(e) $f(x) = 2x^2(x - 2)^3$

3. Use the intermediate value theorem to show that the polynomial has a real zero.

(a) $f(x) = x^3 - 3x + 1$

(b) $f(x) = x^3 + x + 1$

(c) $f(x) = x^5 - 4x + 2$

(d) $f(x) = x^5 + x - 3$

(e) $f(x) = x^4 - 2x - 1$

4. For the given polynomial function, find the x-intercepts (as well as their multiplicities), the y-intercept, describe the end behavior, and sketch the graph.

(a) $f(x) = -2x^4 + 6x^3$

(b) $f(x) = x^4 + 10x^3 + 25x^2$

(c) $f(x) = x^3 - 4x^2 - x + 4$

(d) $f(x) = x^4 + 6x^3 + 9x^2$

(e) $f(x) = -4x^4 + 8x^3$

5. Graph the polynomial function.

(a) $f(x) = (x - 2)^2(x + 1)(x - 3)$

(b) $f(x) = (x - 1)^2(x + 4)(x - 3)$

(c) $f(x) = -x^2(x - 1)(x + 3)$

(d) $f(x) = -x^2(x - 2)(x + 4)$

(e) $f(x) = -2x^2(x - 2)^2(x + 5)$