

Math 150 Week in Review 5 Problem Set

1. Determine the end behavior of the following polynomials.

(a) $P(x) = 5x^8 + 6x^7 - 4x - 9$

(b) $P(x) = -10x^{11} - 5x^6 + 5x^2 - 2$

2. Sketch graphs for the following polynomials.

(a) $P(x) = 2x^3 - x^2 - 10x$

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

3. Use long division to find the quotient and remainder of the following.

(a) $\frac{2x^5 + 4x^3 - 6x + 3}{x^2 - 2x + 1}$

(b) $\frac{3x^3 - 3x^2 + x - 4}{-2x + 3}$

4. Find the polynomial of degree 4 with zeros 1, -2 , and 3, where 1 is a zero of multiplicity 2 and the constant term is 18.

5. Evaluate the following expressions and write in standard form.

(a) i^{30}

(b) $(5 - \sqrt{-9})(-2 + \sqrt{-12})$

(c) $\frac{7 - 4i}{2 - 5i}$

6. Solve the equation $3x^2 - 2x = -1$.

7. Find all intercepts, vertical or horizontal asymptotes, and holes for the following rational functions.

(a) $r(x) = \frac{(3x^2 - 12)(2x - 1)}{(4x^2 + 4x - 3)(x + 2)}$

(b) $r(x) = \frac{x^3 + 2x^2 - 8x}{2x^2 - 8x - 10}$

8. Sketch graphs for the following rational functions.

(a) $r(x) = \frac{-2(x^2 + 5x + 4)(x + 3)}{x^3 - x^2 - 16x + 16}$

(b) $r(x) = \frac{(x + 4)(x - 2)^2}{(x - 3)(x + 1)(x + 5)^2}$

Your instructor may or may not have covered the following:

9. Which of the rational functions in Problems 7 and 8 has a slant (oblique) asymptote? What is its slant (oblique) asymptote?

10. Use synthetic division to find the quotient and remainder when $x^3 - 8x - 5$ is divided by $x + 3$.

11. Factor the polynomial $P(x) = 2x^3 - 3x^2 - 17x + 30$ completely if it is known that $\frac{5}{2}$ is a zero of the polynomial.