

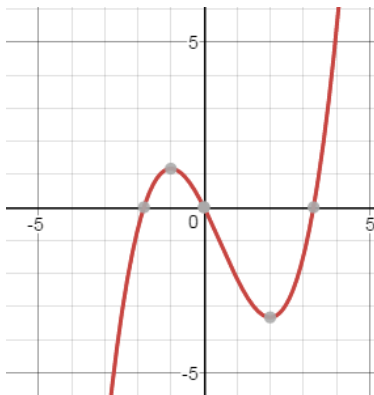
# Algebra II

## Polynomial Review

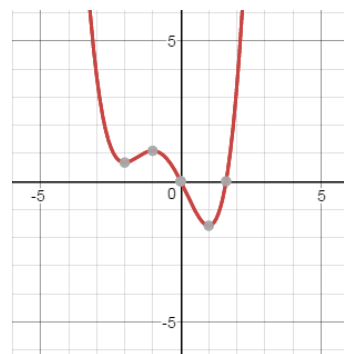
Name \_\_\_\_\_

For the following graphs, state the end behavior and the intervals where the function is increasing and decreasing.

1.



2.



3. State the end behavior and y-intercept of  $f(x) = -2(x+5)^2(x-1)(x-6)^4$

Perform the following operations

4.  $(13m^4 + 2) + (m^4 + 2 - 2m^3) - (5m^4 - 13m^3)$

5.  $(x^2 - 8)(-x^2 + 3x - 5)$

6. Simplify and then classify by degree and the number of terms.  $2x + 3x^2(4x - 5)$

7. Divide using long division.  $(50k^3 - 8k - 7) \div (5k - 3)$

8. If  $g(x) = -x^3 + 3x^2 - 6x - 10$  find  $g(-2)$ .

9. How many solutions (real and complex) does  $f(x) = -3(x+1)(x-7)^3(5x-2)^2$  have?

10. What is the value of  $k$  if  $(x-3)$  is a factor of  $h(x) = x^3 - kx^2 - 4x + 12$

11. Write the polynomial in standard form that has the zeros  $-2, 1, \sqrt{5}, -\sqrt{5}$

12. If  $(-2, 0)$  is an x-intercept of  $f(x) = x^3 + 2x^2 + 25x + 50$  find all solutions and factor into linear factors.

13. Find the polynomial in factored form that has the given zeros and multiplicities.  
5 multiplicity 3,  $-11$  multiplicity 1,  $0$  multiplicity 3

14. Is  $(x - 1)$  a factor of  $g(x) = x^4 - x^3 + 8x - 8$ ? If it is, factor into linear factors.

Sketch the following using degree, end behavior, zeros, multiplicities and y-intercept

15.  $f(x) = -(x + 4)(x - 1)^3(x + 1)^2(x - 2)$       16.  $g(x) = x^3 - 4x^2 + 4x$

17. If  $(x + 7)$  is a factor of  $h(x)$  then what is:

- a. a zero of  $h(x)$
- b. a solution of  $h(x)$
- c. a root of  $h(x)$
- d. an x-intercept of  $h(x)$

18. Write a polynomial function in standard form with x-intercepts  $(-1, 0), (5, 0)$  and  $(-5, 0)$

Solve the following inequalities, show a coordinate plane graph and number line. Write your final answer as an inequality.

19.  $x^4 - 6x^3 - 7x^2 \geq 0$

20.  $(2x + 1)^3(x - 3)^3(x + 4)^2 < 0$