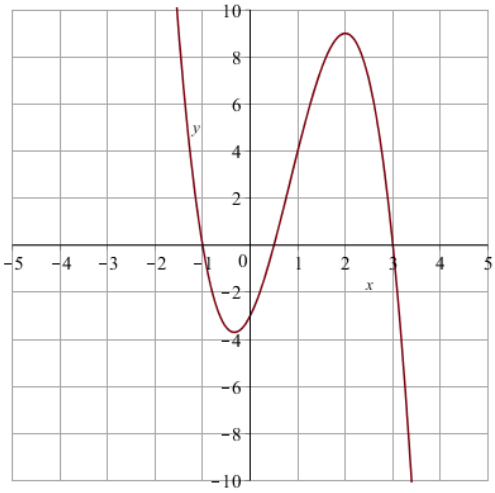
POLYNOMIAL AND RATIONAL FUNCTIONS

Name:	
Date:	
My Achievement Goal for this chapter is… (Circle one) A+ A B C D	
This Assignment is:	
Good to Go	Needs Corrections

Please answer all questions on this sheet and remember to show all your work!

1. Consider the graph of $f(x) = -2(x-a)(x-b)(x-c)$ given below:



   a. Find all the roots of $f(x)$.

   b. Now, re-write $f(x)$ using the information above.

2. Find the remainder of the following polynomials if it is divided by $(x-3)$.
   a. $f(x) = x^3 - x^2 + x - 1$

   b. $g(x) = x^4 - 6x^3 + 11x^2 - 6x$

3. Compute the following long division.

$$(2x^4 + 21x^3 + 35x^2 - 37x + 46) \div (2x + 7)$$

4. The remainder when $kx^4 + 9x^3 - 45x^2 - 57x + 90$ is divided by $(x - 4)$ is 486. Find k.

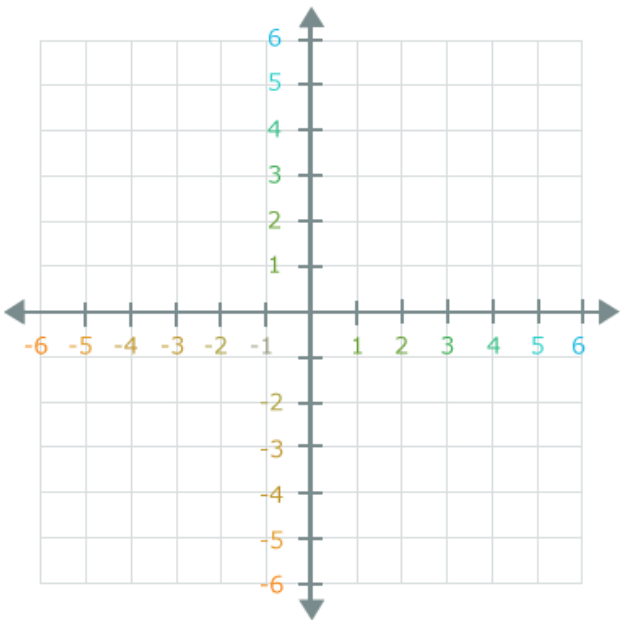
5. Write a cubic polynomial function that has the zeros 2, 3 and 4 and has a leading coefficient of 1.

6. Write the polynomial $x^3 - 2x^2 - 16x + 32$ as a product of linear factors.

7. Solve $x^3 + 3x^2 - 4x - 12 = 0$.

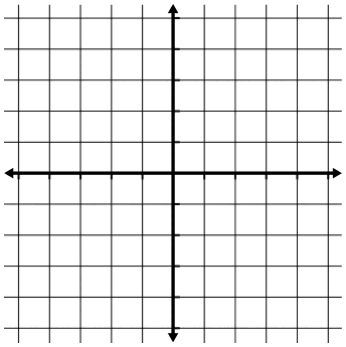
8. (a) State the State the Factor Theorem.

(b) Graph the function $f(x) = 2(x+1)^2(x-1)$.



9.

a. Sketch $f(x) = (x+1)^3$ on the grid provided below.



b. Expand and simplify $f(x) = (x+1)^3$

c. The general third degree monic polynomial looks like:

$$g(x) = x^3 + Ax^2 + Bx + C.$$

If r_1, r_2 and r_3 are the real roots of the given polynomial, then the coefficients A, B and C can be found easily. In particular,

$A = -(r_1 + r_2 + r_3), B = r_1r_2 + r_1r_3 + r_2r_3$ and $C = -r_1r_2r_3$. Using this information, find the coefficients A, B and C. Does your answer confirm the answer in part (b)? Which coefficient gives the y-intercept of $f(x)$?

10. Consider $f(x) = \frac{x^2}{x^2-4}$.
    a. State the vertical and horizontal asymptotes.

    b. Find the domain of $f(x)$.

11. Consider $h(x) = \frac{2x^2-72}{4(x+6)}$.
    a. Find the domain of $h(x)$.

    b. Sketch $h(x)$ and identify all the features of $h(x)$ such as asymptotes, holes, or x and y intercepts.