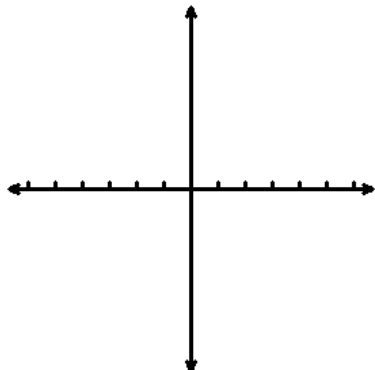
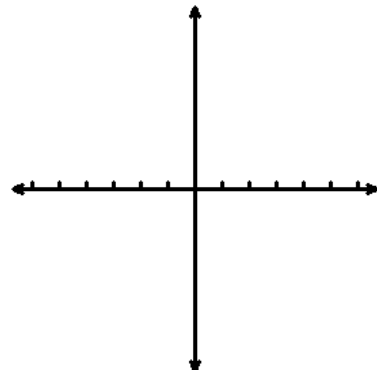


Sketch each polynomial function **WITHOUT** the calculator. Label ALL Intercepts.

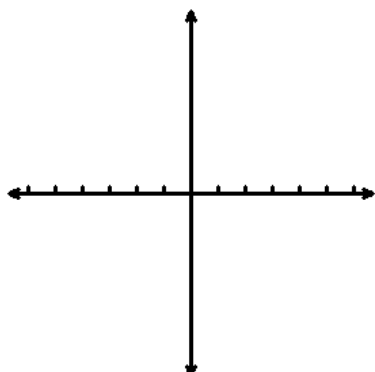
1.  $f(x) = -3(x^2 - 25)(3 + x)(5 - x)^2$



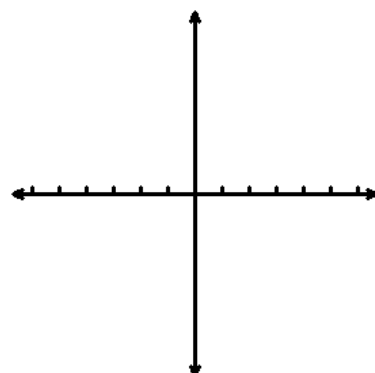
2.  $f(x) = -x^4 - 2x^3 + 24x^2$



3.  $f(x) = x^3 + 4x^2 - 16x - 64$



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



5. Given one root of the polynomial function:

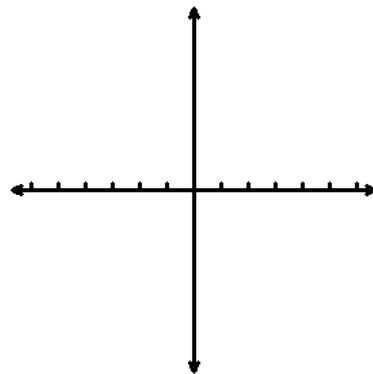
- a. Find the remaining roots of the function. Must **SHOW ALL WORK!!**
- b. Sketch the graph of the function. Label ALL intercepts. **NO CALCULATOR.**
- c. Write  $f(x)$  in factored form.

$f(x) = x^3 - 7x^2 - 5x + 75; x = 5$

a. Roots:

b. Sketch

c. Factors:



6. Given:  $f(x) = x^3 - 4x^2 - 5x + 14$

a. List all possible zeros for  $f(x)$ .

b. Use Descartes' Rule of signs to determine the number of possible positive, negative and imaginary zeros.

+	-	$i$

c. Find ALL roots. Must show work.

#7 – 8. Use synthetic Division to find the **quotient** and the **remainder** for each problem.

7.  $(5x^3 + 18x^2 - 2x - 8) \div (x + 4)$

8.  $\frac{x^4 + 6x^2 - 10}{x - 2}$

Evaluate using the REMAINDER THEOREM. Show work.

9.  $f(x) = x^5 - 3x^4 + 8x^2 - 9x + 27$   
Find  $f(-2)$ .

10.  $f(x) = -3x^4 + 10x^3 + 8x - 5$   
Evaluate  $f(4)$ .

11. Use the Factor Theorem to determine whether  $(x - 3)$  is a factor of  $2x^3 - x^2 + 3$ .

**EXPLAIN Why or Why Not?**

12. If the roots of  $f(x)$  are  $\left\{-8, \frac{4}{9}, 5\right\}$ , express  $f(x)$  as factors. (NO Fractions in factors)

13. Given a polynomial function of degree 5 and roots of :  $6, -\sqrt{10}, 3 + 2i$  . Find the remaining roots.

14. List all possible rational zeros for  $(x) = 5x^4 - 2x^3 + 4x - 8$  .

15. Solve  $2x^3 + 11x^2 - 7x - 6 = 0$  , *given that*  $(x + 6)$  is a factor of the polynomial.

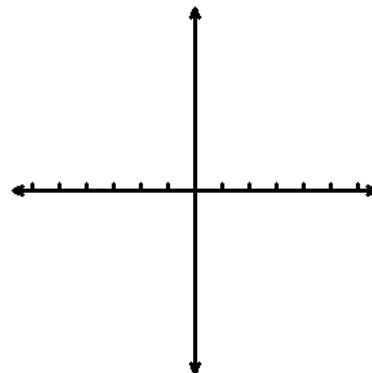
Solution(s): \_\_\_\_\_

16. Given:  $f(x) = 6x^3 - 11x^2 - 4x + 4$

a. Factor  $f(x)$  completely over the set of complex numbers.

Factors: \_\_\_\_\_

c. Sketch the graph.



b. Find the remaining roots.

Roots: \_\_\_\_\_

17. Given:  $f(x) = x^4 - 3x^3 - 5x^2 + 13x + 6$

a. List all possible rational zeros for  $f(x)$ .

b. Solve:  $x^4 - 3x^3 - 5x^2 + 13x + 6 = 0$

Solution(s): \_\_\_\_\_

Factors over the set of Real Numbers: \_\_\_\_\_

Factors over the set of Complex Numbers: \_\_\_\_\_