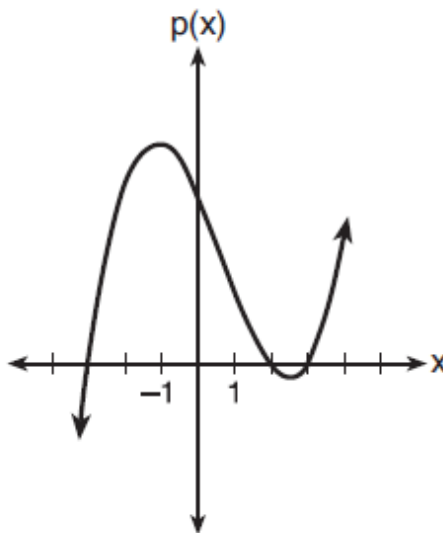


**This portion of the practice packet is NON-CALCULATOR.**

1.) The graph of the function  $p(x)$  is sketched below.



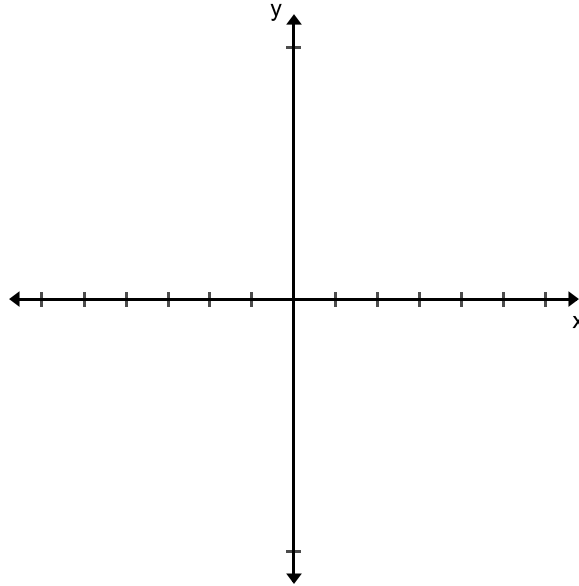
- The leading coefficient of this graph is \_\_\_\_\_. positive or negative
- The degree of this graph is \_\_\_\_\_. Odd or even
- The graph has \_\_\_\_\_ real zero's. 0 or 1 or 2 or 3

2.) When  $g(x)$  is divided by  $x + 4$ , the remainder is 0. Given  $g(x) = x^4 + 3x^3 - 6x^2 - 6x + 8$ , which conclusion about  $g(x)$  is true?

- |                                   |  |
|-----------------------------------|--|
| (a) $g(4) = 0$                    | (b) $g(-4) = 0$                                |
| (c) $x - 4$ is a factor of $g(x)$ | (d) No conclusion can be made regarding $g(x)$ |

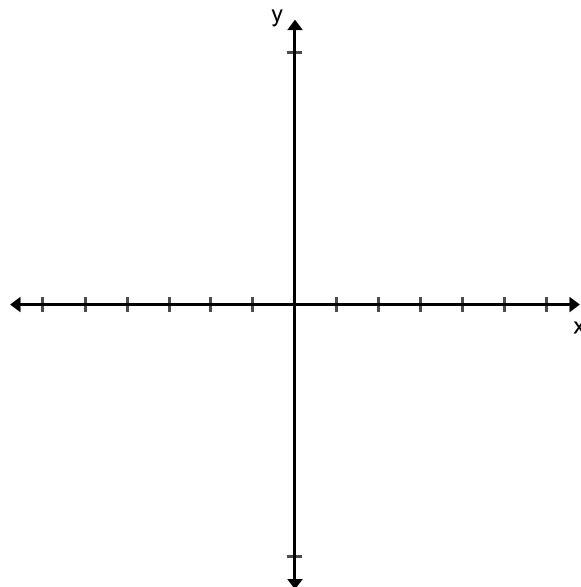
Sketch the graph of the polynomial function on the axes provided.

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



4.) The zeros of a quartic polynomial function  $f$  are  $0, \pm 3, 5$ .

Sketch a graph of  $f(x)$  on the grid below.



**For this portion of the practice packet, a graphing calculator is allowed.**

5.) Determine the quotient and remainder when  $(6a^3 + 11a^2 - 4a - 9)$  is divided by  $(3a - 2)$ .

Express your answer in the form  $q(a) + \frac{r(a)}{d(a)}$ .

6.) Which description could represent the graph of  $f(x) = 4x^3 + 4x^2 - x - 1$  ?

(a) As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ , as  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ , and the graph has 3  $x$ -intercepts.

(b) As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ , as  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ , and the graph has 3  $x$ -intercepts.

(c) As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ , as  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$ , and the graph has 4  $x$ -intercepts.

(d) As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ , as  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ , and the graph has 4  $x$ -intercepts.

7.) Given  $r(x) = x^3 - 4x^2 + 4x - 6$ , find the value of  $r(3)$ .

b. What does your answer tell you about  $x - 3$  as a factor of  $r(x)$ ? **Explain.**

8.) If  $x - 1$  is a factor of the function,  $f(x) = 2x^3 + kx - 6$  find the value of  $k$ .

9.) Given:  $g(x) = x^4 - 2x^2 - 3$  find the average rate of change over the interval  $[0, 3]$ .

10.) Given the polynomial  $f(x) = x^3 - 4x^2 + x + 6$

a. **Justify** that  $x - 2$  is a factor of  $f(x)$ .

b. Find all the zero's of the polynomial *algebraically*.

$x =$ _____
$x =$ _____
$x =$ _____