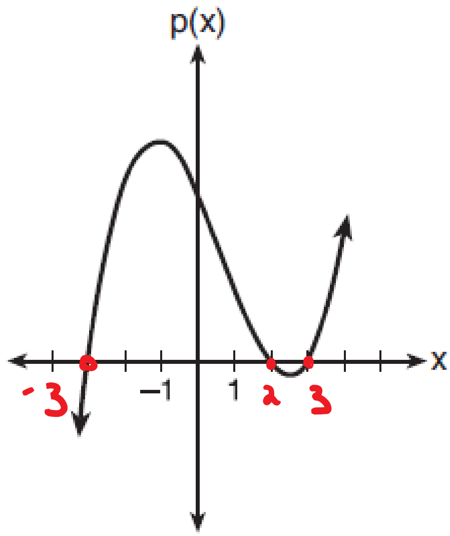
Functions & Trig.
Polynomial Practice 2020

Name ______________________________

This portion of the practice packet is NON-CALCULATOR.

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



$y = (x+3)(x-2)(x-3)$

a. The leading coefficient of this graph is __positive__. positive or negative

b. The degree of this graph is __odd__. Odd or even

c. The graph has __3__ 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) $g(-4) = 0$

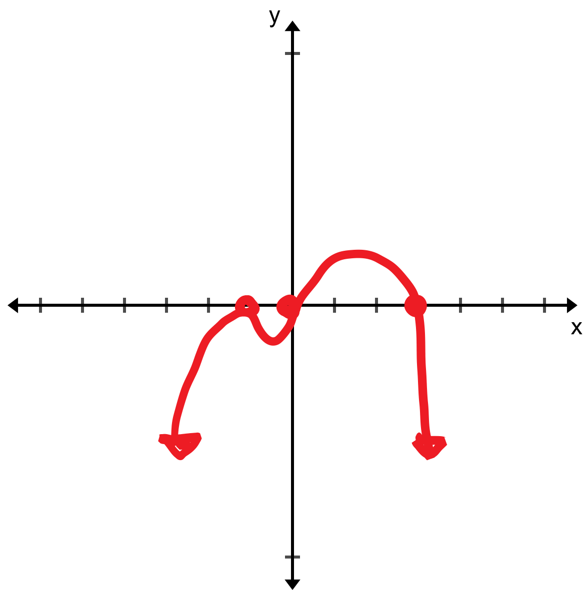
(c) $x - 4$ is a factor of $g(x)$

(d) No conclusion can be made regarding $g(x)$

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

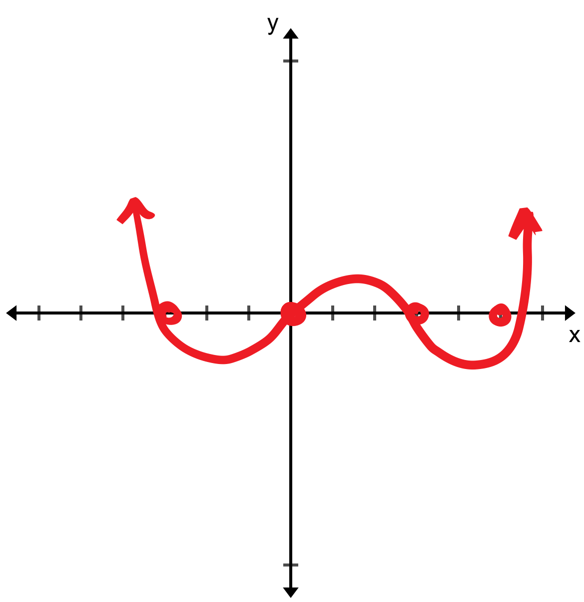
3.) $y = -x(x+1)^2(x-3)$

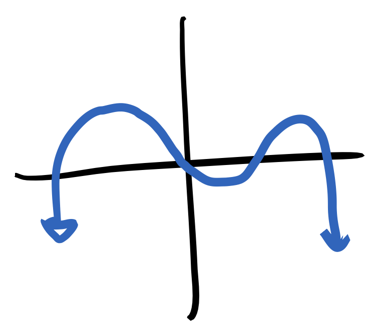
$x = 0, -1, -1, 3$



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 $(3a-2)$.

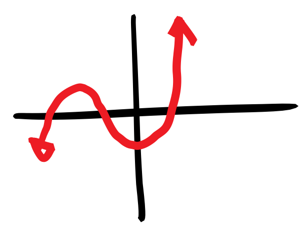
Express your answer in the form $q(a)+\dfrac{r(a)}{d(a)}$.

$$\begin{array}{c|cccc} \frac{2}{3} & 6 & 11 & -4 & -9 \\ & \downarrow & 4 & 10 & 4 \\ \hline & 6 & 15 & 6 & \boxed{-5} \end{array}$$

Divide by 3

$$\boxed{2a^2+5a+2-\frac{5}{3a-2}}$$

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



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

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

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

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

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

$$(3)^3 - 4(3)^2 + 4(3) - 6$$

$$\boxed{-3}$$

$$\begin{array}{r|rrrr} 3 & 1 & -4 & 4 & -6 \\ & \downarrow & 3 & -3 & 3 \\ \hline & 1 & -1 & 1 & \boxed{-3} \end{array}$$

$$\boxed{r(3) = -3}$$

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

$x-3$ is <u>not a factor</u> of $r(x)$ because the remainder is <u>not 0</u>.

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

$$2(1)^3 + k(1) - 6 = 0$$

$$2 + k - 6 = 0$$

$$k - 4 = 0$$

$$\boxed{k = 4}$$

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

x	y
0	-3
1	-4
2	5
3	60

$$\frac{\Delta y}{\Delta x} = \frac{-3-60}{0-3} = \frac{-63}{-3} = \boxed{21}$$

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

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

2	1	-4	1	6
	↓	2	-4	-6
	1	-2	-3	0

x-2 is a factor because the remainder of the division is 0.

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

$x^2 - 2x - 3 = 0$

$(x-3)(x+1) = 0$

$\boxed{x = 3}$ $\boxed{x = -1}$

$x =$ 2

$x =$ 3

$x =$ -1