MATH 30 - Precalculus. Second test. Professor Luis Fernández

NAME:_____

[4] **1.** Write down a polynomial with x-intercepts at $x = 2$, $x = 1$ and $x = -4$, and y-intercept at $y = 16$.

[4] **2.** After dividing a polynomial $p(x)$ by $(x - 5)$, we find that the quotient is $(x^2 + 7)$, and the remainder is 3. How much is $p(5)$?

[6] **3.** Divide the following polynomials. Write the answer as $D = d \cdot q + r$ or as $\frac{D}{d} = q + \frac{r}{d}$ (where D is the dividend, d is the divisor, q is the quotient and r is the remainder).

a) $\dfrac{3x^3 - 5x^2 + 2x - 8}{x^2 - 3x + 2}$

b) $\dfrac{3x^5 - 6x^2 + 2}{x^4 - 2}$

[5] **4.** Factor the polynomial $x^5 - 7x^4 + 6x^3 + 22x^2 - 7x - 15$.

[6] **5.** Find the following logarithms.

a) $\log_2 4 =$

b) $\log_3 81 =$

c) $\log_2 1 =$

d) $\log_4 \frac{1}{16} =$

e) $\log_9 3 =$

f) $\log_4 8 =$

[4] **6.** Suppose that $\log_b 3 = 2$. Use the properties of logarihms to evaluate

a) $\log_b(3b) =$

b) $\log_b 27 =$

[5] **7.** For the rational function $f(x) = \dfrac{4x}{x^2 - 4}$ find

a) Whether it is even, odd or neither.

b) Its Vertical Asymptotes, if any.

c) Its Horizontal Asymptotes, if any, and the end behaviour.

d) Its x-intercepts, if any.

e) Its y-intercept, if any.

NOTE: you <u>do not</u> need to graph it, so do not waste time doing the graph.

[5] **8.** The function g has the following properties:

a) It is neither even nor odd.

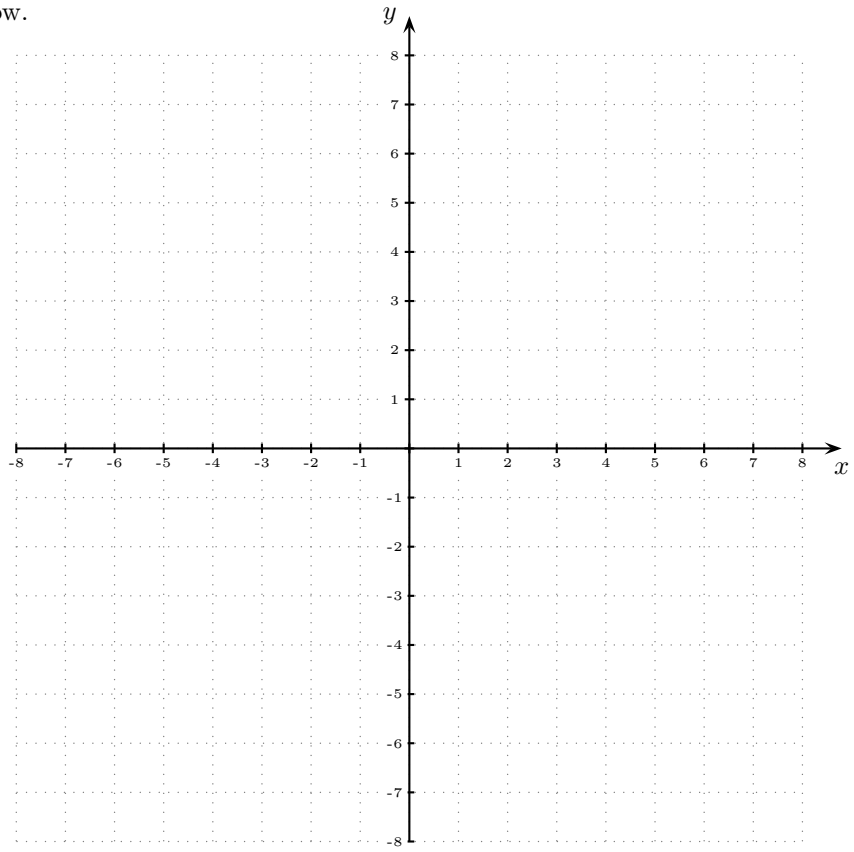
b) It has a Vertical Asymptote at $x = 2$.

c) As $x \to \pm\infty$, $g(x) \approx -\dfrac{1}{x}$ (in particular, g has a Horizontal Asymptote at $y = 0$).

d) Its only x-intercept is at $x = 1$.

e) Its y-intercept is at $y = 2$.

Sketch the graph of g in the axes below.



[5] **9.** Solve the inequality $\dfrac{x-3}{x+2} \leq 0$.