**Math 41** **name**_____

**Exam 3 A**

**March 23, 2016**

**#1-8: 12 points each, #9: 4 points** **No calculators**

1. Find all intercept(s). Write the quadratic function in standard form. Identify the vertex

$$f(x) = 4x^2 + 8x + 3$$

*y*-intercept:

_____

*x*-intercept(s), *if any*:

_____

standard equation and vertex:

2. Use the function $f(x) = 2x^3 - 6x^2 + 4x - 5$ to determine the following:

a) the left and right hand behavior of the function

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b) the number of real zeros

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c) the number of extrema:

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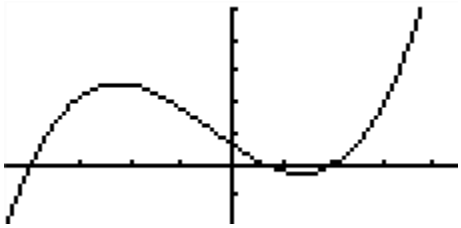
3. Find all real zeros of the function <u>by factoring</u>: $f(x) = x^4 - 10x^2 + 16$

4. Use the remainder theorem to evaluate the function, $f(x) = 3x^5 - 5x^4 - 4x^3 - 12x^2 - 4x + 3$ at $x = -2$.

5. Find all <u>real</u> zeros of the function using the graph, synthetic division, factoring and/or the quadratic formula: $f(x) = 3x^3 + 4x^2 - 28x + 16$



Real zeros:

6. Find all <u>real</u> zeros of the function using the graph, synthetic division, factoring and/or the quadratic formula: $f(x) = x^4 + 2x^3 - 5x^2 - 12x - 4$

Real zeros:

**7**. Find the equations of all vertical and horizontal asymptote(s), if any, of the graph of the function:
*there are no common factors*

$$f(x) = \frac{x^2 - 4x + 4}{x^2 - 16}$$

Vertical Asymptote(s):

Horizontal Asymptote(s):

**8**. Find the slant asymptote(s) of the graph of the function:

$$f(x) = \frac{2x^3 - x + 5}{x^2 + 3}$$

Slant Asymptote(s):

9. Write an equation of a polynomial function, name it $f(x)$ with the following characteristics:
$f(x)$ has a real zero at $x = 1$ of multiplicity of two and a real zero at $x = -2$ of multiplicity of one.
*YOU DO NOT NEED TO EXPAND YOUR FUNCTION'S EQUATION.*

$$f(x) =$$

*Bonus:* Find the ***vertical asymptote(s) and/or hole(s),*** if any, of the graph of the function:

$f(x) = \dfrac{x^2 - 3x - 10}{x^2 - 25}$ . **<u>*Briefly*</u>** explain your answer.

Vertical Asymptote(s):

Hole(s):