ALEKS® Test 1 Sp2011 #5
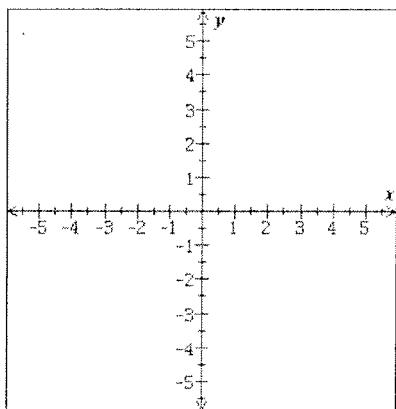
PreCalculus / Mat146 Spring 2012*** (Prof. Porter)

Student Name/ID:

1. Suppose that the function f is defined on the interval $(-2, 2]$ as follows.

$$f(x) = \begin{cases} -1 & \text{if } -2 < x \le -1 \\ 0 & \text{if } -1 < x \le 0 \\ 1 & \text{if } 0 < x \le 1 \\ 2 & \text{if } 1 < x \le 2 \end{cases}$$

Graph the function f.

2. Choose the end behavior of the graph of each polynomial function.

(a) $f(x) = 2x^5 + 6x^3 - 5x - 3$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

(b) $f(x) = 4x^4 - 2x^3 + 2x - 5$

{(a) Rises, (b) Falls} to the left and

{(a) rises, (b) falls} to the right.

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

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

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3. Find a polynomial $f(x)$ of degree 3 with real coefficients and the following zeros.

$$-1 \ , \ 3-i$$

4. Below is the graph of a polynomial function f with real coefficients. Use the graph to answer the following questions about f. All local extrema of f are shown in the graph.
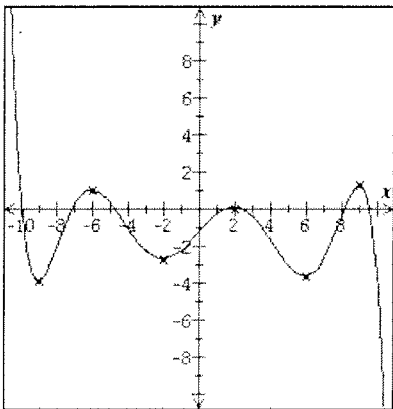
(a) The function f is decreasing over which intervals? Choose all that apply.

$$\left(-\infty,-9\right) \quad \left(-6,-2\right) \quad \left(-6,2\right) \quad \left(2,6\right) \quad \left(6,9\right) \quad \left(9,\infty\right)$$

(b) The function f has local minima at which x-values? If there is more than one value, separate them with commas.

(c) What is the sign of the leading coefficient of f?

Positive   Negative   Not enough information

MORE ↓

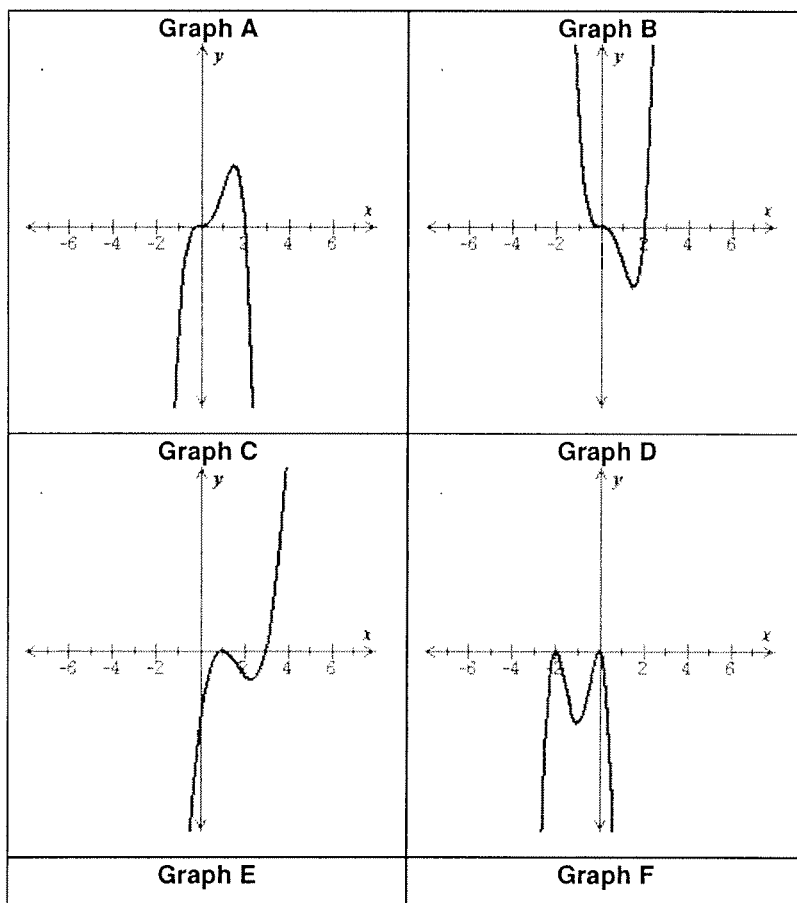(d) Which of the following is a possibility for the degree of f? Choose all that apply.

   4   5   6   7   8   9
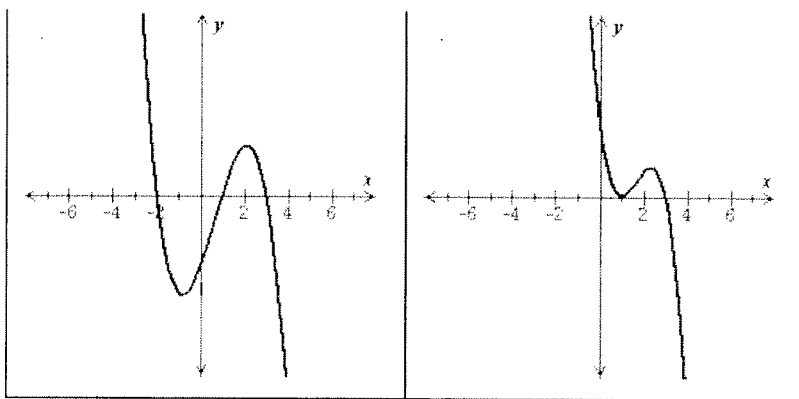
5. Consider the following polynomial functions.

$$f(x) = -4(x-1)^2(x-3)$$
$$g(x) = -6x^4 + 12x^3$$

Choose the graph of each function from the choices below.

Graph A	Graph B
Graph C	Graph D
Graph E	Graph F

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Which is the graph of $f(x) = -4(x-1)^2(x-3)$?
Which is the graph of $g(x) = -6x^4 + 12x^3$?

6. The figure below shows the graph of a rational function f with vertical asymptotes $x = 1$, $x = 5$, and horizontal asymptote $y = 0$. The graph does not have an x-intercept, and it passes through the point $(3, -1)$.

The equation for $f(x)$ has one of the five forms shown below. Choose the appropriate form for $f(x)$, and then write the equation. You can assume that $f(x)$ is in simplest form.

(3,-1)
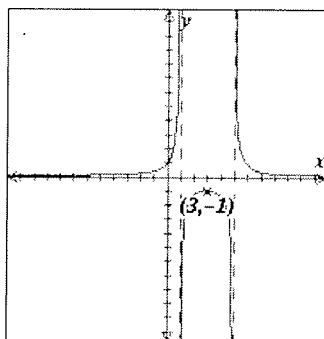
$\bigcirc \quad f(x) = \dfrac{a}{x-b}$

$\bigcirc \quad f(x) = \dfrac{a(x-b)}{x-c}$

$\bigcirc \quad f(x) = \dfrac{a}{(x-b)(x-c)}$

$\bigcirc \quad f(x) = \dfrac{a(x-b)}{(x-c)(x-d)}$

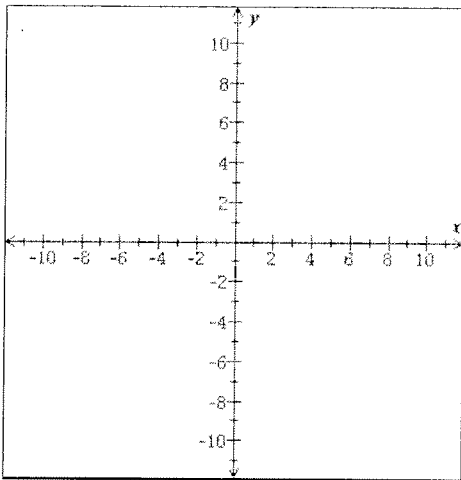$\bigcirc \quad f(x) = \dfrac{a(x-b)(x-c)}{(x-d)(x-e)}$

7. Solve the following inequality.

$$\frac{x+6}{x-2} \leq 0$$

Write your answer using interval notation.

8.
Graph the rational function $h\left(x\right)=\dfrac{-3x+12}{x^2-5x+4}$.

9/10.   What is precalculus?

How does data in your field become an equation?

Suppose that you take a job at a company where you analyze sales figures to determine the best course of action for you company. Use the data from the following table to find an cubic function that you could use to predict sales in subsequent years. SHOW YOUR WORK!

Year:	Sales in millions:
1	3
3	4
5	8
9	11

CUBIC FUNCTION:_____

For the Cubic regression, when will sales reach 5 million?

                                                    ANSWER:_____

For the cubic function, where is the zero?

                                                    ANSWER:_____
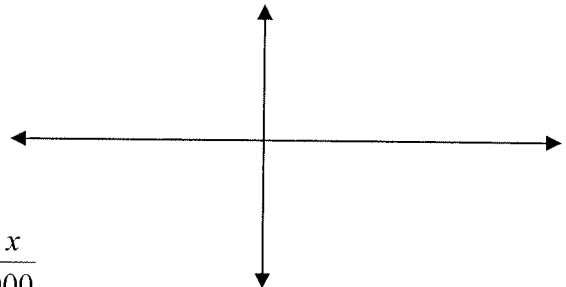
11/12. Your boss gives you the following equation. Give the vertical and horizontal asymptote, as well as intercepts.

$$S = \frac{100x^2 - x}{x^2 - 10,000} = \frac{100x(x - .01)}{(x - 100)(x + 100)}$$

Horizontal:_____
Vertical:_____
x-intercepts:_____

Give a qualitative graph of the equation: $S = \dfrac{100x^2 - x}{x^2 - 10,000}$

The typical revenue function R(x) for sales in your region at a price (x) is given by the function $R(x) = -9,250x^2(x - 9.25 \times 10^{-8})$

Where does the graph just touch and not cross the x-axis?_____

Where does the graph cross thru the x-axis?_____

What is the degree:_____

How many imaginary roots can a real polynomial of degree 4 have?_____

Give a qualitative graph of the function $R(x) = -9,250x^2(x - 9.25 \times 10^{-8})$