Name_____

PRECALC JOURNAL
Polynomial & Rational Functions

1. (a) Two characteristics of the graphs of polynomials are _____ and _____ .
   (b) Their graphs do NOT have _____, _____, _____, or _____.

2. (a) If the limits of the graph of a polynomial are $\lim_{x\to-\infty} f(x) = -\infty$ and $\lim_{x\to+\infty} f(x) = -\infty$, then the degree is (even/odd) _____ and the leading coefficient is (+/-) _____.
   (b) If the limits of the graph of a polynomial are $\lim_{x\to-\infty} f(x) = -\infty$ and $\lim_{x\to+\infty} f(x) = +\infty$, then the degree is _____ and the leading coefficient is _____.
   (c) If the limits of the graph of a polynomial are $\lim_{x\to-\infty} f(x) = +\infty$ and $\lim_{x\to+\infty} f(x) = -\infty$, then the degree is _____ and the leading coefficient is _____.
   (d) If the limits of the graph of a polynomial are $\lim_{x\to-\infty} f(x) = +\infty$ and $\lim_{x\to+\infty} f(x) = +\infty$, then the degree is _____ and the leading coefficient is _____.

3. Given the equation of a polynomial, the maximum number of real roots it can have is _____ _____ while the maximum number of relative extrema the can occur in the graph is _____.

4. (a) Write a brief series of steps for finding the roots of a third degree or higher polynomial by hand.

   (b) If you were asked to solve the polynomial equation $x^4 - 7x^3 + 5x^2 + 31x - 30$, the possible factors you should test in Step 1 are _____

   (c) If you were asked to solve the polynomial equation $2x^3 - x^2 - 16x + 15$, the possible factors you should test in Step 1 are _____

5. Before solving a rational equation, you should first identify the _____ .

6. Write a series of steps for solving a rational inequality that is greater than or less than a number other than zero.

7. The general process for simplifying an expression like $\frac{8x^3(3x-5)^5(x^2+6)^{-2}-2x^2(3x-5)^6(x^2+6)^{-3}}{(x^2+6)^4}$ is to _____. *(Do NOT explain exactly how to work this problem!)*

8. The two types of problems in this chapter which require you to check your answers are _____ _____ .

9. (a) The purpose of decomposing a rational expression into partial fractions is _____ _____

   (b) When breaking a rational expression into partial fractions, what should you put in the numerator of each of the following fractions?

$$\frac{\quad}{x^3+\#}+\frac{\quad}{x^2+\#}+\frac{\quad}{x+\#}+\frac{\quad}{x^2}+\frac{\quad}{x}$$

   (c) If you were to break the following rational expression into partial fractions, what fractions would initially need to be set up? $\frac{x^2-2x-3}{x^3(x-4)^2}$

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