NAME _____ DATE _____ PD _____

PRECALCULUS **Review** **Polynomials and Rational Functions**

Section 2.5 – Complex Zeros and the Fundamental Theorem of Algebra

1. Write the polynomial in standard form, and identify the zeros of the function.

   a. $f(x)=(x-2)(x+3i)(x-3i)$

   b. $g(x)=\left(x-(1+2i)\right)\left(x-(1-2i)\right)$

   c. $h(x)=\left(x-2-i\sqrt{3}\right)\left(x-2+i\sqrt{3}\right)$

2. Write a polynomial function of minimum degree in standard form with real coefficients whose zeros include those listed.

   a. $x=6$, $x=i\sqrt{3}$

   b. $x=4-2i$

   c. $x=\frac{1}{3}$, $x=5i$

   d. $x=1-3i$, $x=1+3i$

3. Find all of zeros and write a linear factorization of the function.

   a. $f(x)=x^4-10x^3+23x^2$

   b. $h(x)=x^4-7x^2+12$

   c. $f(x)=2x^3-9x^2+2x+30$ (Hint: $x=-\frac{3}{2}$)

   d. $f(x)=6x^4+11x^3-16x^2-11x+10$

   e. $f(x)=x^3-x^2-x-2$

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

   g. $k(x)=2x^4-9x^3+23x^2-31x+15$

   h. $l(x)=3x^4-7x^3-3x^2+17x+10$

   i. $w(x)=x^4-5x^3+9x^2-45x$

   j. $h(x)=3x^3-9x^2+4x-12$

4. Using the given zeros, find all of the zeros and write a linear factorization of the function.

   a. $f(x)=x^4+2x^3+3x^2+8x-4$; $x=2i$ is a zero.

Section 2.7 – Solving Equations in One Variable

1. Solve each equation algebraically. Check for extraneous solutions. Confirm graphically.

   a. $\frac{10}{x^2-2x}+\frac{4}{x}=\frac{5}{x-2}$

   b. $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{x^2-6x+8}$

   c. $\frac{5x-6}{x^2-6x+8}-\frac{2}{x^2-6x+8}=\frac{x+5}{x-2}$

   d. $\frac{1}{x-1}+\frac{x+4}{3}=\frac{x+6}{3}$

Section 2.6 – Graphs of Rational Functions

1. Graph each reciprocal function.

   a. $f(x)=\frac{1}{x}+4$

   b. $g(x)=\frac{1}{x+2}-3$

   c. $f(x)=3-\frac{1}{x+1}$

   d. $g(x)=-\frac{1}{x-2}-1$

2. Graph each function. (find holes, asymptotes, and intercepts)

   a. $f(x)=\frac{x-3}{x+2}$

   b. $w(x)=\frac{2}{2x^2-x-3}$

   c. $f(x)=\frac{2x^2-2}{x^2-4}$

   d. $h(x)=\frac{x-1}{x^2-x-6}$

   e. $k(x)=\frac{x^2+x-2}{x^2-x-6}$

   f. $f(x)=\frac{x^2+x+1}{x^2-1}$

   g. $f(x)=\frac{x^2-4x+5}{x+3}$

   h. $h(x)=\frac{2x^2+2x-3}{x+3}$

   i. $g(x)=\frac{x^2-3x-7}{x+3}$

Section 9.2 – Binomial Theorem

1. Construct the first 8 rows of Pascal's Triangle.

2. Simplify each expression.

   a. $(a+b)^4$

   b. $(x-3)^4$

   c. $(a+b)^5$

   d. $(x-1)^5$

Graphing Calculator Questions

1. Find local minimums, local maximums, and x intercepts.

   a. $f(x)=x^3-2x^2-1$

   b. $g(x)=-x^4+2x^3-x+3$

2. Use your graphing calculator to solve each equation.

   a. $x^3-x^2+1=-2x^2+4x+3$

   b. $x^{2x^2}=\ln(x+3)-\frac{1}{4}$