NAME _____ DATE _____ PD _____

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

Section 2.5 – Complex Zeros and the Fundamental Theorem of Algebra

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

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

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

b. $f(x)=\dfrac{2x^2-2}{x^2-4}$

c. $k(x)=\dfrac{x^2+x-2}{x^2-x-6}$

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

e. $f(x)=\frac{2x^2-5x-3}{x^2-x-6}$

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

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

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