Honors Advanced Math

Name________________________

Review 1

Topics for Review

sections are from the Demana textbook unless otherwise noted.

Basic Functions, Polynomials, and Limits
Chapters 1 and 2 and 10.3

Problems

1. Decide whether each function is odd, even, both, or neither. Then prove it.

a. $f(x) = 3\tan x + 2\sin x$

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

c. $f(x) = x^3 + 5$

2. Describe a sequence of linear transformations to turn the graph of $f(x)$ into the graph of $g(x)$.

a. $f(x) = 2x^2 + 1,\ g(x) = -2(x+7)^2 + 5$

b. $f(x) = \sqrt{x},\ g(x) = \sqrt{2x+5}$

3. Let $f(x) = x^2 + 5$ and $g(x) = \sqrt{x}$. Find $(g \circ f)(x)$ and $(f \circ g)(x)$.

4. Suppose $g(x) = \frac{2x+3}{x-5}$. Find $\lim\limits_{x\to\infty} g^{-1}(x)$.

5. Let $f(x) = \begin{cases} x+11 & \text{if} \quad x < -1 \\ x^2 + bx + c & \text{if} \quad -1 \le x \le 2 \\ \log_2 x & \text{if} \quad x > 2 \end{cases}$

Find values of *b* and *c* that make $f(x)$ continuous on its domain.

Honors Advanced Math

Name________________________

Review 1

6. Find a cubic polynomial, $C(x)$, with real coefficients has the following properties:

- $1-2i$ is a complex root.
- the graph of $C(x)$ has an x-intercept at $x=2$.
- $f(1)=-12$

7. Prove that the quotient of two complex numbers is complex. In other words, show that the quotient can be expressed in the form $a+bi$. State any restrictions that are necessary.

8. Solve each equation. Find all solutions.

a. $x^3 = x^2 + 23x + 42$

b. $x^3 = -8$

9. Suppose $f(x)=\begin{cases} \cos x & if \quad x<\pi \\ \dfrac{2x^2-7x-15}{x^2-9x+20} & if \quad x\geq\pi \end{cases}$. Find

a. $\lim\limits_{x\to\pi} f(x)=$

b. $\lim\limits_{x\to\pi^-} f(x)=$

c. $\lim\limits_{x\to4^-} f(x)=$

d. $\lim\limits_{x\to5} f(x)=$

e. $\lim\limits_{x\to-\infty} f(x)=$

f. $\lim\limits_{x\to\infty} f(x)=$