Exam 2
Chapters 2 and 3

Answer the following questions. *Answers without proper evidence of knowledge will not be given credit.* Make sure to make reasonable simplifications. Do not approximate answers. Give exact answers. **No calculators are allowed on this exam.**

True or False (2 points each)

_____ **1.** $\sqrt{a+b} = \sqrt{a} + \sqrt{b}$

_____ **2.** $(3 \cdot 4)^2 = 3^2 \cdot 4^2$

_____ **3.** $(a+b)^2 = a^2 + b^2$

_____ **4.** $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$

_____ **5.** $\frac{a}{b} + \frac{c}{d} = \frac{a+c}{b+d}$

_____ **6.** $\frac{x+4}{x-4} + \frac{x+5}{x+4} = \frac{(x+4)+(x+5)}{(x-4)+(x+4)}$

_____ **7.** If a function is one-to-one then it is invertible.

_____ **8.** $(5^4)^2 = (5^2)^4$

Show your work!

1. (9 points) Which of the following represents a function? (Mark all that apply.)
(a) $x^2 + y^2 = 1$ (b) $h = \{(1,2),(5,6),(3,2)\}$ (c) $f(x) = x^3$

2. Let $f(x) = x^2 + 1$ and $g(x) = 3x + 7$. Evaluate the following and simplify. (5 points each)

a) $f \circ g(x)$.

b) $g \circ f(x)$.

3. Let $f(x) = \sqrt{x-3} + 7, g(x) = x^3 + 1$ and $h(x) = (x-7)^2$. Evaluate the following functions and find there domains. (You do not need to simplify!) (5 points each)

a) $f + g(x)$.

b) $h \cdot g(3)$.

c) $f/h(x)$.

4. Let $j(x) = (x-1)^2 + 3$. Evaluate the following and simplify.

a) $j(t)$ (3 points)

b) $j(3x+1)$ (7 points)

5. By completing the square, write $f(x) = x^2 + 6x - 4$ in vertex form and state the vertex. (10 points)

6. Determine all possible rational zeroes for the polynomial function $h(x) = 3x^5 + 4x^4 - 3x^2 + 15$. (10 points)

7. Use the graphs given below to solve the following inequalities. (5 points each)

a) $-x^3 \geq -4x$.

b) $x^3 + 4x^2 - x - 4 < 0$.

8. Find the asymptotes of the graph of $\frac{x^2-2x+1}{x-2}$.

Extra Credit

EC 1. Determine if $f(x) = \frac{\sqrt{3x-1}+7}{2}$ is invertible. If so, find $f^{-1}(x)$. (5 points)

EC 2. Suppose y varies directly as x and inversely as the square of z. If $y = 9$ when $x = 18$ and $z = 3$ then what is the varation constant, k?