MATH 06 THIRD EXAMINATION. FALL 2013

Do all questions and show all the work. The total number of points in the test is 114.

Due 11/25/2013

1. (15 points) Simplify the following expressions:
   (a) $2\sqrt[3]{24} - 4\sqrt[3]{81} + 3\sqrt[3]{3}$
   (b) $(3 - \sqrt{2})^2$
   (c) $32^{3/5}$
   (d) $(8x^6y^10)^{-1/3}$
   (e) $(-3 + 5i)(1 + 2i)$
   (f) $\frac{1+3i}{2-3i}$

2. (24 points) Simplify:
   (a) $\frac{x^2-1}{x^2+2x+1} \div \frac{x-1}{2x^2-x-3}$ (a') $\frac{3x+7}{x+5} + \frac{2x+18}{x+5}$
   (b) $\frac{a-b}{5} - \frac{31-4b}{4}$ (b') $\frac{3x}{x+5} - \frac{5x}{x-3}$
   (c) $\frac{3x-7}{x^2-4} + \frac{2x-18}{x^2-3x+2}$ (c') $\frac{4x^2-25}{x^2+x-12} \cdot \frac{2x^2-6x}{4x^2-10x}$
   (d) $\frac{\frac{3}{x-4}-2}{1-\frac{4}{x-4}}$ (d') $\frac{\frac{1}{x-1}+1}{\frac{1}{x-1}-1}$

3. (15 points) Given the quadratic function $f(x) = 3x^2 - 6x - 9$.
   (a) Find the y-intercept.
   (b) Find the x-intercepts.
   (c) Find the vertex.
   (d) Sketch the graph.

4. (5 points) Solve the equation $\frac{5}{3x-2} = \frac{3}{2x+4}$.

5. (10 points) Given the functions $f(x) = 2^x$ and $g(x) = \log_2(x)$:
   (a) Complete the table:

x	f(x)	x	g(x)
-3		1/8	
-2		1/4	
-1		1/2	
0		1	
1		2	
2		4	
3		8	

   (b) Sketch the graph of f and g in the same axis of coordinates.

6. (10 points) Compute the x in each case by changing to exponential form:
   a) $\log_2(x) = 5$, $b) \log_x(3) = 2$ $c) \log_8(4) = x$ $d) \log_{27}(1/9) = x$

7. (10 points) In a right triangle, the lengths of the legs are $a = 4$ and $b = 6$.
   (a) Find the length of the hypotenuse c.
   (b) Find the value of $\sin(A), \cos(A)$ and $\tan(A)$.

8. (10 points) Complete the table with the exact value of each trigonometric function:

Angle	sin	cos	tan	cot	sec	csc
$135°$						
$750°$						
$-4\pi/3$						
$9\pi/4$						
$420°$						
$240°$						

9. (5 points) Verify the identity: $\csc(\theta)\tan(\theta)\cos(\theta) = 1$.

10. (10 points) Sketch one cycle of the graph of $f(x) = -3\sin(4x)$. Identify Amplitude (A), Period (T) and Phase Shift. Identify Zeroes, Maxima and Minima.