

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 06
Fall 2014

Third Exam
Day (2 Hours)

1. (12 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. (12 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. (5 points) Solve the equation $3^{2x-1} = 1/81$.

6. (10 points) Given the functions $f(x) = 2^x$ and $g(x) = \log_2(x)$:

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

- (a) Complete the table:

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

7. (8 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) $\log_{27}(1/9) = x$

8. (5 points) If an angle θ in the third quadrant has $\sin(\theta) = -3/5$. Find the value of $\cos(\theta)$ and $\tan(\theta)$.
9. (10 points) Complete the table with the exact value of each trigonometric function:

Angle	sin	cos	tan	cot	sec	csc
135°						
75°						
$-4\pi/3$						
$9\pi/4$						
420°						
240°						

10. (5 points) Verify the identity: $\csc(\theta) \tan(\theta) \cos(\theta) = 1$.
11. (8 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.