



Prince Sultan University
Orientation Mathematics Program

Math 002
Midterm Examination
Semester I, Term 101
Tuesday, November 9, 2010
Time Allowed: 100 minutes

Student Name:

Student ID #:

Section #: 211 , 212

Instructor's Name:

Serial #:

Important Instructions:

1. You may use a scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You may NOT use notes or any textbook.
4. There should be NO talking during the examination.
5. Your exam will be taken immediately if your mobile phone is seen or heard.
6. Looking around or making an attempt to cheat will result in your exam being cancelled.
7. This examination has 12 problems, some with several parts. Make sure your paper has all these problems.

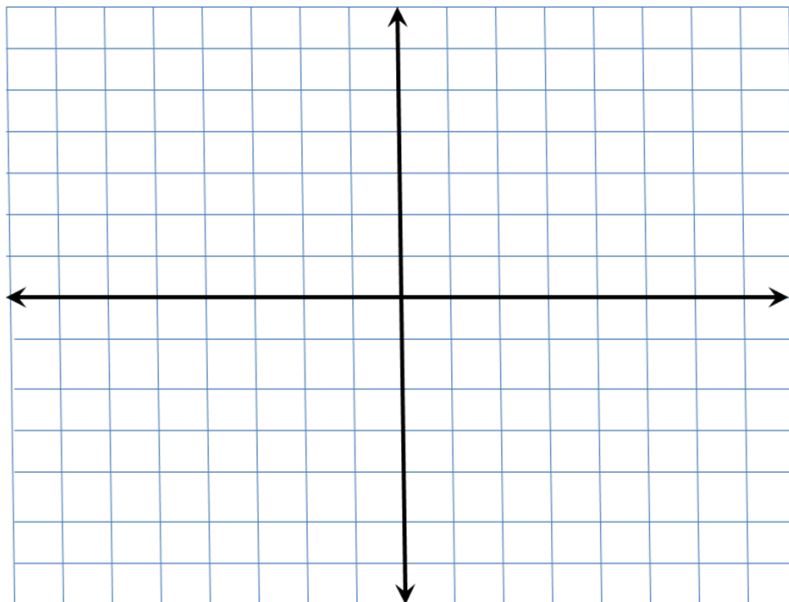
Problems	Max points	Student's Points
1	30	
2,3,4	18	
5,6,7	18	
8,9	14	
10,11,12	20	
Total	100	

Q.1 (30 points/ 2 points each) Write only the **final answer** for each part of the following questions:

#	Questions	Answers
1	Evaluate $\log_2 8 + \log_5 25$.	
2	Find a cofunction with the same value as $\csc\left(\frac{\pi}{4}\right)$	
3	Solve the equation $5^x = 1.4$	$x =$
4	Change the following logarithmic expression $\log_{81} 3 = \frac{1}{4}$ to its equivalent exponential form.	
5	Find the range of the function $f(x) = \log(16 - x^2)$	
6	Convert the angle 135° to radians.	
7	Find the range of $f(x) = 5\sin(3x - \pi)$.	
8	Find the angle θ , $0 < \theta < 360$, that is coterminal with the angle $\frac{27\pi}{5}$	
9	Let $\cot\theta > 0$ and $\sec\theta < 0$. Name the quadrant in which the angle θ lies in.	
10	If θ is an acute angle and $\sin\theta = \frac{\sqrt{3}}{2}$, find $\sec\theta$.	
11	Use your calculator to find $\sin\frac{3\pi}{10}$ to <u>four decimal</u> places.	
12	Let $y = \frac{1}{2}\cos\left(\frac{4x}{5} + \frac{\pi}{2}\right)$, find the phase shift of y	
13	Use your calculator to find $\cot e^{\sqrt{3}}$ to <u>three decimal</u> places.	
14	Find $\sin(\sin^{-1} 2.4)$	
15	Use your calculator to find $\tan^{-1}(-30)$ to <u>two decimal</u> places.	

Show all steps for each question

Q.2 (6 points) Graph $g(x) = 2^{x-1} + 3$. Find the domain, range, and write the equation of its asymptote.



Q.3 (6 points) Expand the following logarithmic expression $\log \left[\frac{(x+2)^3 \sqrt[6]{y}}{9(z-7)^4} \right]^2$ as much as possible.

Q.4 (6 points) Condense the following logarithmic expression as a single logarithm whose coefficient is 1

$$3\left[\log 4 + \frac{1}{3}\log(x^5 - 200) - \log 5 - \frac{1}{6}\log(x - 2)\right]$$

Q.5 (6 points) Solve the logarithmic equation $\log_4(x-6) - \log_4(x+6) = 2$.

Q.6 (6 points) Let $P = (4, -7)$ be a point on the terminal side of an angle θ . Find the exact value of each of the six trigonometric functions of θ .

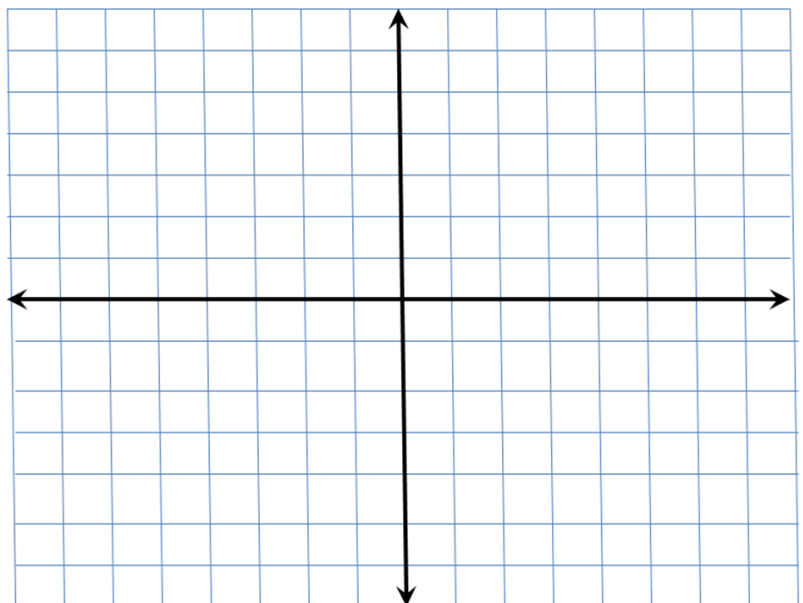
Q.7 (6 points) Showing all details, use reference angles to find the exact value of the following two expressions:

(a) $\sec(-150^\circ)$

(b) $\cot\left(\frac{23\pi}{4}\right)$

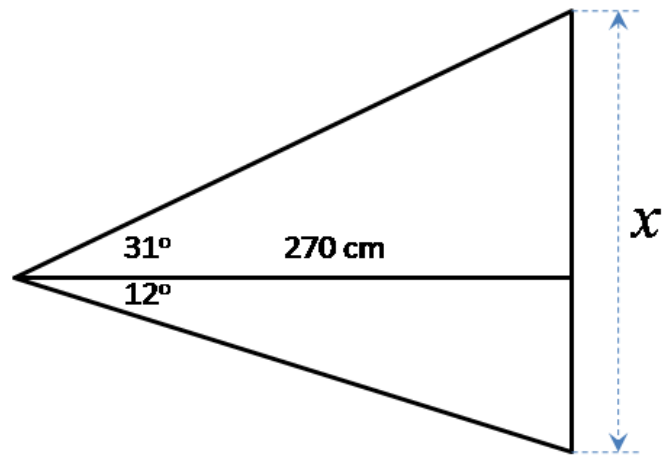
Q.8 (6 points) Use a sketch to find the exact value of $\csc\left(\cos^{-1}\left(\frac{\sqrt{25-x^2}}{5}\right)\right)$, $0 \leq x \leq 5$

Q.9 (8 points) Graph one period of the function $y = \frac{-5}{2}\sin(2x - \frac{\pi}{3}) + 1$, Show all details and give the amplitude, period, and phase shift.



Q10. (6 points) The KLCC building is 457 meter high. If you stand 865 meter from the base of the building and look to the top, find the angle of elevation to the nearest degree.

Q11. (6 points) In the figure shown, find the length x .



Q12. (8 points) Verify the following identities

i) $1 - \frac{\sin^2 x}{1 + \cos x} = \cos x$.

ii) $\sec^2 x + \csc^2 x = \sec^2 x \cdot \csc^2 x$