PRINCE SULTAN UNIVERSITY

Department of Mathematical Sciences

MATH 002 Midterm Examination

Tuesday, 29 November 2005
(051)

Time allowed: 120 minutes

Student Name: _____

Student ID number: _____

Section: _____

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. If your mobile phone is seen or heard, your exam will be taken immediately.
6. You must show all your work beside the problem. Be organized.
7. You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
8. This examination has 13 problems, some with several parts. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1, 2, 3	22	
4, 5, 6	18	
7, 8, 9	24	
10, 11	20	
12, 13	16	
Total	100	

1. (10 points) Approximate each expression using a calculator. Round your answer to three decimal places.

   (a) $7^{\sqrt{3}} =$

   (b) $e^{0.87} =$

   (c) $\log_{0.3}(19) =$

   (d) $\sec 55^{\circ} =$

   (e) $\cos^{-1}\frac{3}{8} =$

2. (6 points) Graph $f(x) = \log_4 x$ and $g(x) = \log_4(x-3)$ in the same rectangular coordinate system. Plot at least 2 points. **Give** the domain of $f(x)$ and $g(x)$.

3. (6 points) Find the **exact** value of $\tan[\cos^{-1}(-\frac{1}{4})]$.

4. (8 points) Solve $e^{2x} - 2e^{x} - 3 = 0$. Express the solution set in terms of natural logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

5. (6 points) Expand $\log\left[\frac{10x^2\sqrt[3]{1-x}}{7(x+1)^2}\right]$ as much as possible.

6. (4 points) convert each angle in radians to degrees. Round to two decimal places

   i. 3 radians =

   ii. $\frac{\pi}{13}$ radians =

7. (6 points) Solve for x : $\log_4[\log_3(\log_2 x)] = 0$

8. (12 points) Find the **exact** value of each expression. Do not use a calculator.

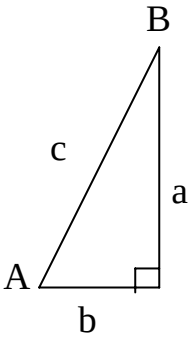
i. $\cos 225^\circ =$

ii. $\csc \frac{7\pi}{6} =$

iii. $\cot \frac{9\pi}{4} =$

9. (6 points) Solve the right triangle shown below. Round length to two decimal places and express angles to the nearest tenth of a degree.

$a = 30.4$, $c = 50.2$



10. (12 points) Verify each identity.

(i) $(\cot^2\theta+1)(\sin^2\theta+1)=\cot^2\theta+2$

(ii) $1-\dfrac{\sin^2 x}{1+\cos x}=\cos x$

(iii) $\sin(x+\dfrac{3\pi}{2})=-\cos x$

11.(8 points) Solve the logarithmic equation $\ln\sqrt{x+3}=1$. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

12.(8 points) Solve each of the following equations on the interval $[0, 2\pi)$.

(i) $\cos x - 2\sin x \cos x = 0$, $0 \le x < 2\pi$.

(ii) $\sin 3x = 1$

13. (8 points) Determine the amplitude, period and phase shift of $y = -2\sin \pi x$. Then graph one period of the function. Show the coordinates of the five key points on the graph.