Prince Sultan University
Orientation Mathematics Program
MATH 002
Midterm Examination
Semester I, Term 061
Monday, November 20, 2006
Net Time Allowed: 100 minutes

Student Name: _____

Student ID #: _____ Section #: _____

Teacher's Name: _____

Important Instructions:
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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. Questions 1-10 are Multiple-choice. Two Marks each. Make sure that you have chosen the correct answer and write the correct letter in the attached table on the first page.
8. Questions 11-20 are written-problems. Four Marks each. Provide an organized complete solution for each Question.
9. This examination has 20 problems. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1-10	20	
11-13	12	
14-16	12	
17-18	8	
19-20	8	
Total	60	

From Q1 to Q10 (2 points each) **Choose the correct answer and fill the table by the letters, which represent the correct answers**.

Question #	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Answer										

Q1. Find the domain of $f(x) = \log_5(x^2 - 9)$

A. $(-\infty, -3) \cup (3, \infty)$

B. $(-\infty, -3] \cup [3, \infty)$

C. $[-3, 3]$

D. $(-3, 3)$

E. $(3, \infty)$

Q2. Evaluate using a calculator $\log_9 59.7$, Round the answer to three decimal places.

A. 1.776

B. 2.776

C. 1.861

D. 2.909

E. 4.089

Q3. Solve and check your answers : $\log_{36}(x+5) + \log_{36} x = \frac{1}{2}$

A. $\{1, -6\}$

B. $\{2, 3\}$

C. $\{3\}$

D. $\{2\}$

E. $\{1\}$

Q4. Find the length of the arc on a circle of radius 25 meters intercepted by a 144° central angle, Round the answer to two decimal places.

A. 314.16 *m*

B. 20 *m*

C. 62.83 *m*

D. 3600 *m*

E. 58.27 *m*

Q5. If $\cos\theta = \frac{5}{7}$ and $\tan\theta < 0$, find the **exact** value of $\csc\theta$.

A. $\frac{2\sqrt{6}}{7}$

B. $\frac{-7\sqrt{6}}{12}$

C. $\frac{-2\sqrt{6}}{7}$

D. $\frac{7\sqrt{6}}{12}$

E. $\frac{-12}{7\sqrt{6}}$

Q6. Which of the following is the period of : $y = -5\cos(3x + \pi)$

A. $\frac{2\pi}{3}$

B. $\frac{\pi}{3}$

C. $\frac{-2\pi}{3}$

D. $\frac{-\pi}{3}$

E. $\frac{2\pi}{5}$

Q7. Find the **exact** value of : $\cos\left[sin^{-1}(\frac{-1}{2})\right]$

A. $\frac{2}{\sqrt{3}}$

B. $\frac{-1}{2}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{3}}{2}$

E. $\frac{1}{\sqrt{3}}$

Q8. Find the length of b in the triangle on the right if: $A = 28^{\circ}$ and $c = 5\,m$

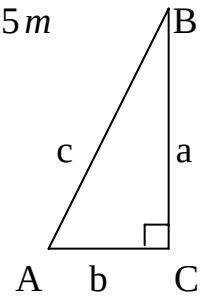
A. 2.9 m

B. 1.6 m

C. 4.4 m

D. 2.3 m

E. 3.5 m



Q9. Simplify: $\cos(x - \frac{\pi}{2})$

A. $\cos x$

B. $\sin x$

C. $-\sin x$

D. $-\cos x$

E. $1 + \cos x$

Q10. Solve: $\cos 2\theta = \frac{-\sqrt{2}}{2}$ on the interval $[0, 2\pi)$

A. $\frac{5\pi}{4}, \frac{7\pi}{4}, \frac{13\pi}{4}$, and $\frac{15\pi}{4}$

B. $\frac{3\pi}{4}, \frac{5\pi}{4}, \frac{11\pi}{4}$, and $\frac{13\pi}{4}$

C. $\frac{5\pi}{8}, \frac{7\pi}{8}, \frac{13\pi}{8}$, and $\frac{15\pi}{8}$

D. $\frac{5\pi}{3}, \frac{7\pi}{3}, \frac{11\pi}{3}$, and $\frac{13\pi}{3}$

E. $\frac{3\pi}{8}, \frac{5\pi}{8}, \frac{11\pi}{8}$, and $\frac{13\pi}{8}$

From Q11 to Q20 (4 points each) **Provide a complete solution for each Question**.

Q11. The annual amount that we spend to attend events can be modeled by $f(x) = 2.05 + 1.3\ln x$ where x represents the number of years after 1984 and $f(x)$ represents the total annual expenditures for admission to operator sports, in billions of dollars. In 2000, approximately how much was spent on admission to spectator sports? Round the answer to three decimal places

Q12. Use logarithmic properties to expand the following expression. Where possible, evaluate logarithmic expressions: $\log_5 \dfrac{\sqrt[7]{x^3}}{125y^4}$

Q13. Solve the exponential equation. Then use a calculator to find the answer correct to three decimal places. $e^{2x-10} - 23 = 54$

Q14. The angle of elevation of a building from a point on the ground $80\ m$ from its base is 35°. Find the height of the building to the nearest meter.

Q15. Find the **exact** value of the following:

i) $\tan 330^\circ$

ii) $\sin(\frac{-3\pi}{4})$

iii) $\sec 210^\circ$

iv) $\cot(\frac{-5\pi}{6})$

Q16. Determine the period and the phase shift. Then graph one period of

$$y = -4\cos(2x - \tfrac{\pi}{2})$$

Q17. Find the **exact** value of the following:

i) $\csc 480^\circ$

ii) $\cos(\frac{4\pi}{3}+\frac{\pi}{4})$

iii) $\sin(60^\circ - 45^\circ)$

iv) $\sin 25^\circ \cos 5^\circ + \cos 25^\circ \sin 5^\circ$

Q18. Solve $4\cos^2 x = 5 - 4\sin x$ on the interval $[0, 2\pi)$

Q19. Use a right triangle to write the expression as an algebraic expression. Assume that x is positive and in the domain of the given inverse trigonometric function

$\cot[\sin^{-1}(\frac{\sqrt{x^2-9}}{x})]$

Q20. Verify the identity: $\frac{1}{1+\cos x}+\frac{1}{1-\cos x}=2+2\cot^2 x$