Prince Sultan University

Deanship of Educational Services

Department of Mathematics and General Sciences

COURSE DETAILS:

ORIENTATION MATHEMATICS II	MATH 002	MAJOR EXAM I A
Semester:	Fall Semester --Term 181	
Date:	Sunday October 14, 2018	
Time Allowed:	90 minutes	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	
Instructor's Name:	

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 1	Page 2	Page 3	Page 4	Page 5	Total	Total
Questions							
Marks	**10**	**10**	**18**	**19**	**23**	**80**	**20**

Q.1 (20 points) **Choose the correct answer**

1) Determine the domain and range, and asymptote of the function $h(x) = 3^{x-2} + 4$

A) Domain: $(2, \infty)$; Range: $(-\infty, \infty)$, Asymptote: $y = 4$

B) Domain: $(-\infty, \infty)$; Range: $(4, \infty)$, Asymptote: $y = 4$

C) Domain: $(-\infty, \infty)$; Range: $(4, \infty)$, Asymptote: $x = 4$

D) Domain: $(-\infty, \infty)$; Range: $(2, \infty)$, Asymptote: $x = 4$

2) Rewrite the expression as a single logarithm. $\log_9 3 + 3\log_9 2$

A) $\log_9 6$

B) $\log_9 24$

C) $\log_{24} 9$

D) $\log_9 11$

3) The point $\left(\frac{-\sqrt{7}}{4}, \frac{3}{4}\right)$ is on the unit circle corresponding to a real number t.

Find the values of $\tan(t)$.

A) $\frac{-\sqrt{7}}{3}$

B) $\frac{-3\sqrt{7}}{7}$

C) $\frac{-\sqrt{7}}{4}$

D) $\frac{-4\sqrt{7}}{7}$

4) If θ is an acute angle and $\cos\theta = \frac{1}{3}$, find $\csc\left(\frac{\pi}{2} - \theta\right)$.

A) –3

B) 3

C) $\frac{3\sqrt{2}}{4}$

D) $\frac{-1}{3}$

5) Find the degree measure of the angle: 1.6 rad.

A) 104.02°

B) 54.99°

C) 128.35°

D) 91.67°

You must write the correct answer to each question in the box below

Question	**1**	**2**	**3**	**4**	**5**
Answer					

6) Find a positive angle less than 360° that is coterminal with the angle $\theta = 790^\circ$

A) 250°

B) 10°

C) 290°

D) 70°

7) Determine the quadrant in which angle $\theta = -190^\circ$ lies.

A) *QI*

B) *QII*

C) *QIII*

D) *QIV*

8) Express the equation in logarithmic form. $3^4 = 81$

A) $\log_4 3 = 81$

B) $\log_{81} 3 = 4$

C) $\log_4 81 = 3$

D) $\log_3 81 = 4$

9) Find the reference angle to the angle $\theta = \dfrac{-47\pi}{6}$

A) $\dfrac{\pi}{6}$

B) $\dfrac{5\pi}{6}$

C) $\dfrac{\pi}{3}$

D) $\dfrac{-\pi}{6}$

10) Use the Laws of Logarithms to rewrite the expression: $\ln \sqrt[9]{3x^8 y}$

A) $\dfrac{1}{9}\ln 3 + \dfrac{1}{9}\ln x + \dfrac{1}{9}\ln y$

B) $\dfrac{8}{9}\ln 3 + \dfrac{8}{9}\ln x + \dfrac{8}{9}\ln y$

C) $\dfrac{1}{9}\ln 3 + \dfrac{8}{9}\ln x + \dfrac{1}{9}\ln y$

D) $\ln 3 + \dfrac{8}{9}\ln x + \dfrac{1}{9}\ln y$

You must write the correct answer to each question in the box below

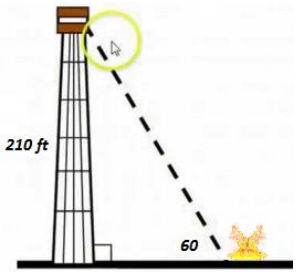
Question	**6**	**7**	**8**	**9**	**10**
Answer					

Q.2 (7 points) : Use transformations to **graph** $f(x) = -\ln(x+1) - 2$, and give the **equation of the asymptote**, **domain** and **range** of $f(x)$.

Q.3 (4 points): Expand the following logarithmic expression as much as possible. **Simplify** where possible.

$$\ln\left[\frac{\sqrt[3]{x+1}.y^2}{e^2.z^4}\right]$$

Q.4 (4 points): A forest ranger is standing on a lookout tower in a forest. His observation position is 210 feet above the ground level when he spots an illegal camp fire. The angle of elevation from the fire to the top of the lookout tower is 60^0 . Find the distance between the base of the tower and the fire.



Q.5 (3 points): Find the exact value of the following **without using a calculator. (Show all your steps)**

$$1+\sin^2 70^\circ + \sin^2 20^\circ$$

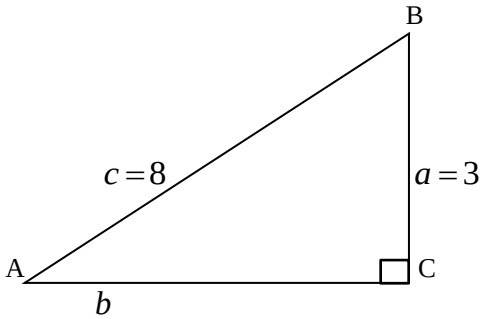
Q.6 (12 points) : Solve the following equations.

a) $3^{x^2-12} = 9^{2x}$

b) $2^{2x} + 2^x - 12 = 0$

c) $\ln(x-2) - \ln(x+3) = \ln(x-1) - \ln(x+7)$

Q.6 (7 points): Find the exact value of each of the trigonometric functions of θ



Q.7 (4 points): Find the length of the arc on a circle of radius 5 centimeters intercepted by a central angle $\theta = 115^\circ$. Round answer to two decimal places.

Q.8 (6 points): Use **reference angle** and a **sketch** to find the **exact value**. **Don't** use the calculator directly and **show all your steps.**

a) $\cos\left(\frac{35\pi}{6}\right)$

b) $\tan\left(210^\circ\right)$

Q.9 (8 points) : Given that $\csc\theta = -4$ and $\tan\theta > 0$. Find the exact value of the remaining trigonometric functions of θ .

Q.10 (5 points): The value of a house is given by the exponential function $V = 300e^{0.086t}$ where V is the value of the house in thousands of dollars t years after year 2010. When(what year) will the house be worth 600 thousand dollars?