



COURSE DETAILS:

ORIENTATION MATHEMATICS II		MATH 002	FINAL EXAM	A
Semester:	Spring Semester --Term 172			
Date:	Saturday May 05, 2018 (8:30 A.M.)			
Time Allowed:	180 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	Page 6	Total	Total
Questions								
Marks	12	12	21	19	18	18	100	40

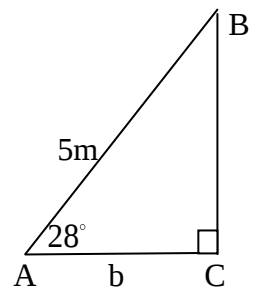
Q.1 (24 points) Choose the correct answer

- 1) The directrix of the parabola $(x-4)^2 = 8(y+3)$ is:
A) $y = -3$
B) $y = -5$
C) $x = -5$
D) $x = 2$
- 2) The vertices of $\frac{(x+3)^2}{9} - \frac{(y-2)^2}{4} = 1$ are _____?
A) $(0, 2), (-6, 2)$
B) $(-3, 5), (-3, -1)$
C) $(-1, 2), (-5, 2)$
D) $(-3, 4), (-3, 0)$
- 3) The domain of the function $f(x) = \log(x-e)^2$ is:
A) (e, ∞)
B) $(-\infty, e) \cup (e, \infty)$
C) $(-\infty, e)$
D) $\mathbb{R}$
- 4) If $\log_a 3 = A$ and $\log_a 2 = B$, then $\log_a \left(\sqrt{\frac{9}{16}} \right) =$
A) $2A - B$
B) $3A - B$
C) $2A + B$
D) $A - 2B$
- 5) The equation of the ellipse in standard form with vertices: $(0, -8), (0, 8)$, and foci: $(0, -5), (0, 5)$ is:
A) $\frac{x^2}{39} + \frac{y^2}{64} = 1$
B) $\frac{x^2}{25} + \frac{y^2}{39} = 1$
C) $\frac{x^2}{25} + \frac{y^2}{64} = 1$
D) $\frac{x^2}{64} + \frac{y^2}{39} = 1$
- 6) Which of the following statements is TRUE?
A) $\cos\left(\cos^{-1}\left(-\frac{3}{2}\right)\right) = \frac{3}{2}$
B) $\sin\left(\sin^{-1}\left(\frac{3}{2}\right)\right) = \frac{3}{2}$
C) $\sin\left(\sin^{-1}\left(-\frac{3\pi}{4}\right)\right) = \frac{\pi}{4}$
D) $\tan(\tan^{-1} 100) = 100$

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

Question	1	2	3	4	5	6
Answer						

- 7) 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 meters
B) 20 meters
C) 62.83 meters
D) 58.27 meters
- 8) If $\cos \theta = \frac{5}{7}$ and $\tan \theta < 0$, find the **exact** value of $\sin \theta$.
- A) $\frac{-7\sqrt{6}}{12}$
B) $\frac{-2\sqrt{6}}{7}$
C) $\frac{2\sqrt{6}}{7}$
D) $\frac{-\sqrt{74}}{7}$
- 9) Find the length of b in the given right triangle.
- A) 4.4 m
B) 2.9 m
C) 2.3 m
D) 3.5 m
- 10) Classify the graph of $x^2 - y^2 - 6x + 4y + 9 = 0$
- A) Ellipse
B) Parabola
C) Circle
D) Hyperbola
- 11) Find the value of x if $\left(\frac{2}{3}\right)^x = \frac{16}{81}$
- A) -4
B) 4
C) 3
D) -3
- 12) Given $A_{2 \times 3}$, $B_{3 \times 5}$ and $C_{2 \times 5}$. Which of the following operations is defined?
- A) $A \cdot B + B$
B) $B \cdot A + C$
C) $A \cdot B + C$
D) $C \cdot B + A$



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

Question	7	8	9	10	11	12
Answer						

Q.2 (4 points) **Expand** the following logarithmic expression as much as possible,

$$\log \left[\frac{1000x^2(x+2)}{7(x-9)^5} \right]^2$$

Q.3 (4 points) **Solve** the equation: $\ln x + \ln(x+5) - \ln(6) = 0$

Q.4 (4 + 3 points) **Verify** the identity

a) $\frac{1}{\cos \theta} - \frac{\cos \theta}{1 + \sin \theta} = \tan \theta$

b) $\frac{\sin(\alpha - \beta)}{\sin \alpha \cdot \cos \beta} = 1 - \cot \alpha \cdot \tan \beta$

Q.5 (6 points) **Solve** the equation: $3\cos^2 x = \sin^2 x$; $0 \leq x \leq 2\pi$

Q.6 (6 points) Let $\sec \theta = -\frac{7}{3}$ and θ be in quadrant III. Find the exact value of **the remaining trigonometric functions** of θ .

Q.7 (4 + 3 points) Let $A = \begin{bmatrix} 0 & -2 & 7 \\ 5 & 4 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 \\ -1 & 5 \\ 6 & 0 \end{bmatrix}$, and $C = \begin{bmatrix} 2 & -6 \\ 4 & -8 \end{bmatrix}$.

Perform the following operations, if possible.

a) $2AB - C$

b) C^{-1}

Q8 (6 points) Find the **exact value** of the expression (**Show all your steps**).

a) $\sin\left(\frac{17\pi}{3}\right)$

b) $\cos 165^\circ$

Q.9 (4+2+4 points) If $A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & -2 & 1 \\ -2 & -3 & 0 \end{bmatrix}$

a) Find the **determinant** of A .

b) Does matrix A have an inverse? **Give the reason.**

c) Use Cramer's Rule to solve the system of equations for y **only**:
$$\begin{cases} x - y + z = 1 \\ -2y + z = 2 \\ -2x - 3y = 0 \end{cases}$$

Q.10 (8 points) Solve the following system of equations using the **inverse of the coefficient matrix**, A^{-1}
(Write the solution set, if any)

$$2x + y = 2$$

$$x + y - z = 4$$

$$3x + 2y + z = 0$$

Q.11 (8 points)

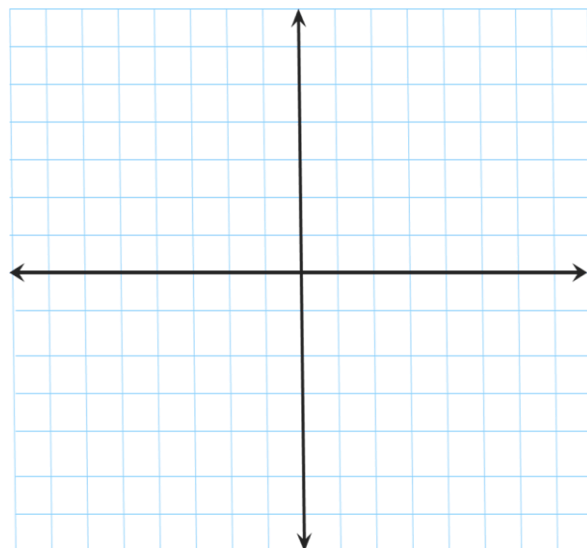
a) Write the equation: $9x^2 + 4y^2 - 36x - 40y + 100 = 0$ in **standard form**.

b) Give the **center**

c) Name the **major axis (vertical or horizontal)**

Q.12 (10 points) Consider the equation, $\frac{(y-1)^2}{9} - \frac{(x+2)^2}{4} = 1$.

a) Find the coordinates of the **center, the foci, and the vertices**



b) **Graph** the equation.

c) Give the **equations of the asymptotes**.