Prince Sultan University

Deanship of Educational Services

PYP Department / Mathematics

COURSE DETAILS:

ORIENTATION MATHEMATICS II	MATH 002	FINAL EXAM B
Semester:	Fall Semester --Term 191	
Date:	Saturday December 14, 2019	
Time Allowed:	120 minutes (2 hours)	

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.
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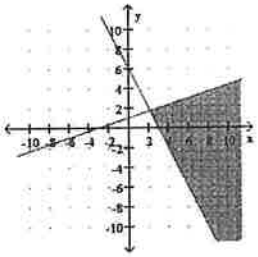
GRADING:

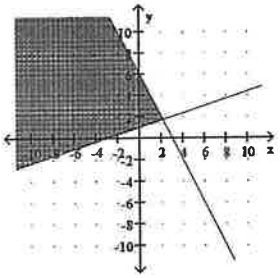
	Page 1	Page 2	Page 3	Page 4	Page 5	Total	Total
Questions							
Marks	10	10	19	18	23	80	40

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

1) Which shaded region is the **solution set** for the system of inequalities? $\begin{cases} 3x-y \le -3 \\ x+2y \ge 6 \end{cases}$



A)



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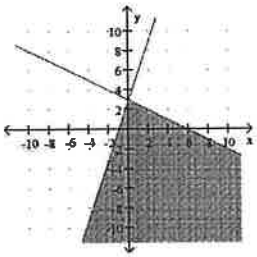
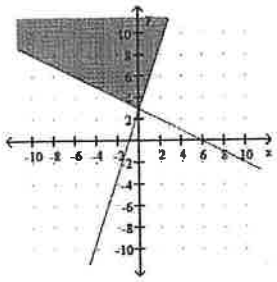


C)



D)

2) Use the following determinant to find the **value of** x. $\begin{vmatrix} 2 & x \\ 6 & 9 \end{vmatrix} = 12$

A) $x = 27$
B) $x = 5$
C) $x = 1$
D) $x = -1$

3) **Expand** the logarithmic expression **as much as possible.** $\log\left(\dfrac{x^4 \cdot \sqrt[3]{x+5}}{x^2}\right)$

A) $4\log x + 3\log(x+5) - 2\log x$

B) $4\log x + \dfrac{1}{3}\log(x+5) - 2\log x$

C) $\log x^4 + \log(x+5)^{\frac{1}{3}} - \log x^2$

D) $4\log x + \dfrac{1}{3}\log x + \dfrac{1}{3}\log 5 - 2\log x$

4) Find the **equation** of the parabola with the given information. Focus $(15,0)$; Directrix: $x = -15$

A) $y^2 = 60x$
B) $y^2 = 15x$
C) $y^2 = -60x$
D) $x^2 = 60y$

5) A building that is **122 meter** tall casts a **shadow 180 meter** long. Find the **angle** of elevation of the sun to the nearest **degree**.

A) 43°
B) 47°
C) 56°
D) 34°

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

Question	1	2	3	4	5
Answer					

6B) If $\tan\theta = -\frac{2}{5}$ and $\sin\theta > 0$, find the **exact value** of $\cos\theta$

A) $\cos\theta = \frac{5\sqrt{29}}{29}$

B) $\cos\theta = -\frac{\sqrt{29}}{2}$

C) $\cos\theta = -\frac{5\sqrt{29}}{29}$

D) $\cos\theta = -\frac{\sqrt{21}}{5}$

7) The **reference angle** for $\theta = -240^\circ$ is:

A) -60°
B) 30°
C) 120°
D) 60°

8) Find the **domain** of the logarithmic function: $f(x) = 2 + \log_3(x-5)$

A) $(2,\infty)$
B) $\mathbb{R} - \{5\}$
C) $(5,\infty)$
D) $(-\infty,5)$

9) Find the **phase shift** of $y = -5\cos(2\pi x - 8\pi)$ is:

A) 4
B) 1
C) -5
D) 4π

10) Find the **equation of the ellipse** in the standard form with vertices: $(5,0)$, $(-5,0)$ and with foci: $(3,0)$, $(-3,0)$

A) $\frac{x^2}{25} - \frac{y^2}{16} = 1$

B) $\frac{x^2}{25} + \frac{y^2}{16} = 1$

C) $\frac{x^2}{34} + \frac{y^2}{25} = 1$

D) $\frac{x^2}{16} + \frac{y^2}{25} = 1$

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

Question	6	7	8	9	10
Answer					

Q.2B (9 points): **Solve** the following system of linear equation using **the inverse matrix of the coefficients.** $\begin{cases} x + 2z = 6 \\ -x + 2y + 3z = -5 \\ x - y = 6 \end{cases}$

Q.3 (6 points): Use **Cramer's Rule to solve** the following system for ***z only***: $\begin{cases} x + 2z = 3 \\ 2x + 3y = 10 \\ 2y - z = 6 \end{cases}$

Q.4 (4 points): Find the **algebraic expression** of $\sec\left(\tan^{-1}\left(\frac{x}{3}\right)\right)$ given that x is positive.

Ssow all your steps

Q.5B (8 points): Find the solution set for each of the following equations.

a) $\log_2(x-3) = 2 + \log_2(x+2) - \log_2 x$

b) $8e^{6x-5} + 3 = 27$

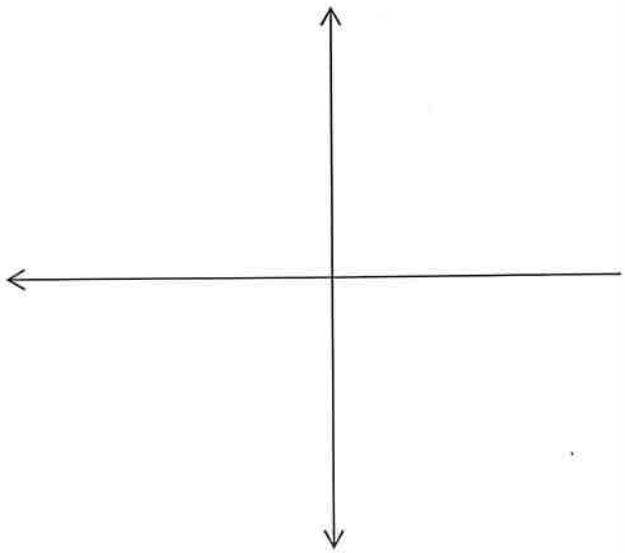
Q.6 (6 points): Let $f(x) = -2^{x+2} + 3$.

a) Find the **domain**

b) Find the **range**

c) Find the **equation of the asymptote.**

d) **Sketch** the graph



Q.7 (4 points): Us **Sine or Cosine formula** and **reference angle** to find the **exact value.**
Show all your steps. Don't use the calculator directly.

$\cos(160^\circ)\cos(40^\circ) + \sin(160^\circ)\sin(40^\circ)$

Q.8B (6 points): **Solve** the following equation: $2\sin^2 x + 3\sin x + 1 = 0$ on the interval $\left[0, 360^\circ\right)$

Q.9 (8 points): Given that $A = \begin{bmatrix} -3 & 2 \\ -5 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -6 \\ 4 & -8 \end{bmatrix}$

Solve for matrix X in the matrix equation: $BX - 3A = 2I_2$

Q.10 (9 points): Given the conic section: $25x^2 - 9y^2 = 225$

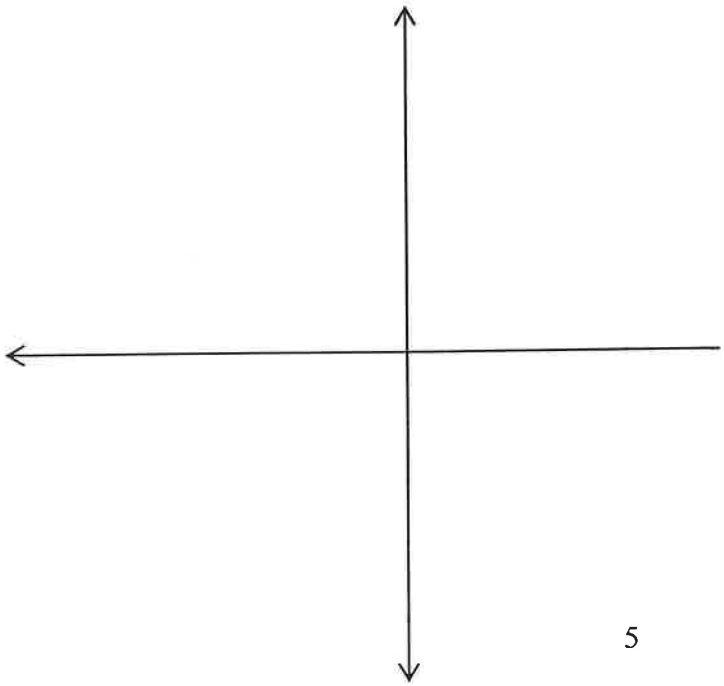
a) Find the coordinates of the **center**

b) Find the coordinates of the **vertices**

c) Find and locate of the **foci**

d) Find the equations of the **asymptotes**, if any

e) **Graph** the conic section



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B) $(5,\infty)$

C) $\mathbb{R}-\{5\}$

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C) $\frac{x^2}{25}-\frac{y^2}{16}=1$

D) $\frac{x^2}{25}+\frac{y^2}{16}=1$

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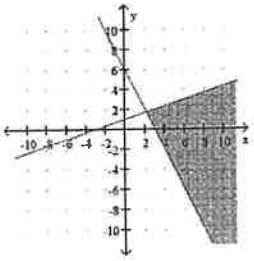

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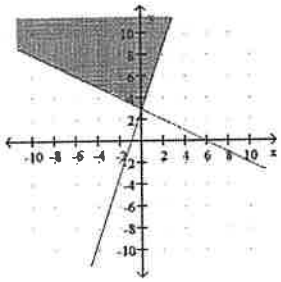

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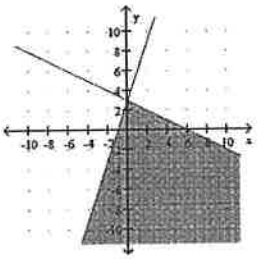

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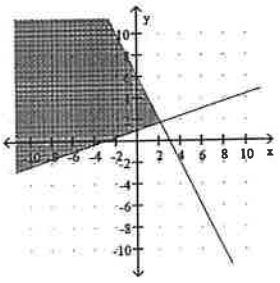

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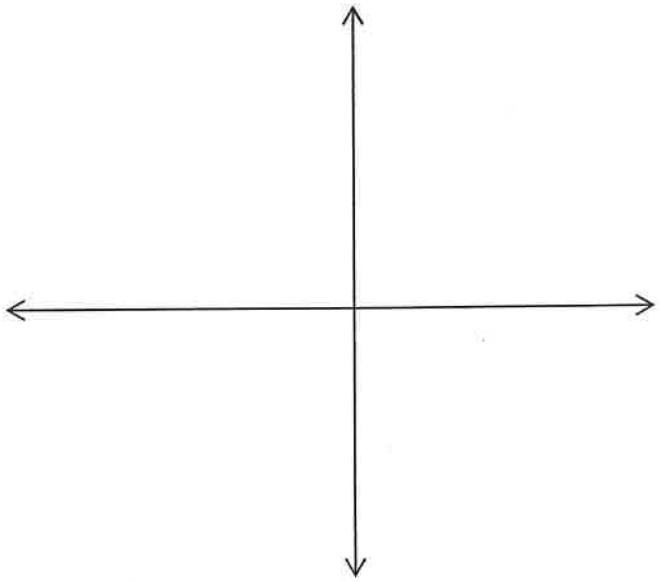

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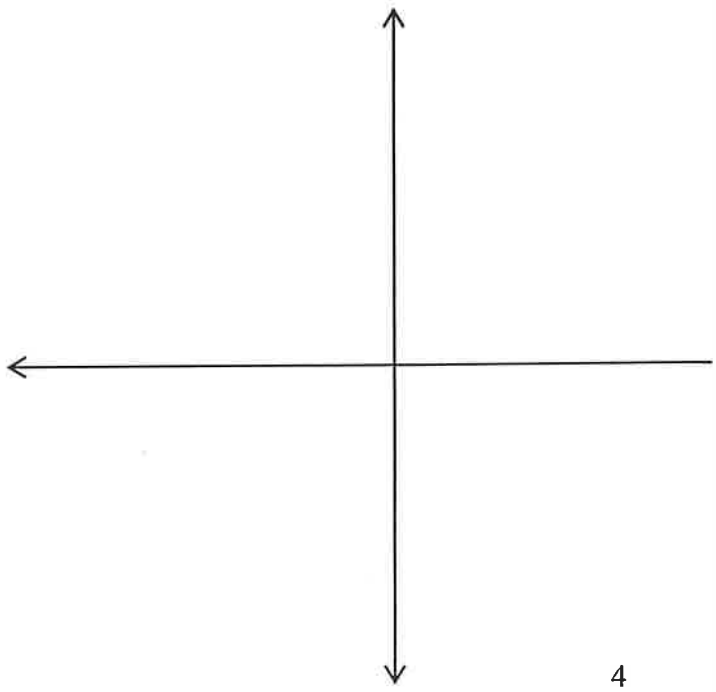

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