UNIVERSITY AT ALBANY
STATE UNIVERSITY OF NEW YORK

AMAT100 PreCalculus Exam 3A Fall 2024

Print Name:

UAlbany Email:

Directions: You have **80 minutes** to answer the following questions. ***You must show all necessary work*** as neatly and clearly as possible. Clearly indicate your final answers by placing a box or circle around it.

No calculators, notes, textbooks, mobile phones or other aids are allowed. Do not detach pages.

Problem	Possible	Points
1	12	
2	12	
3	12	
4	12	
5**	5	
Total	48	

**Optional Extra Credit Problems

(Similar to HW10 and Practice Problems 12) (3 Points Each)

(1) (a) Find the domain of $f(x) = \log(3x - 16)$. Write your answer using interval notation.

(b) The value of $\log_3(9) =$ _____.

(c) The value of $\ln\left(\frac{1}{e^5}\right) =$ _____.

(d) The value of $1000^{\log 2} =$ _____.

(Logarithmic Properties)

(2) (a) (6 Points) Write the expression below as a sum or difference of logarithms with no exponents. *Simplify your answer completely.*

$$\log\left(\frac{x^{1/3}y^{-2}}{z^5}\right)$$

(b) (6 Points) Write the expression below as a **single** logarithm.

$$2\log_3(x+7)+\log_3(x-5)-3\log_3(x+1)$$

(3) (Similar to Practice Assessment 13, HW11)

(a) (6 Points) Solve for x:

$$3^{x-1} = \left(\frac{1}{27}\right)^{2-x}$$

(b) (6 Points) Solve for x:

$$\log_{12}(x-1) + \log_{12}(x+3) = 1$$

(Similar to Practice Assessment 14)

(4) A person's blood pressure, P (in millimeters of mercury) is given by

$$P(t) = 100 - 20\cos\left(\frac{\pi}{3}t\right),$$

where t is the time in seconds. You do not need to show work.

(a) (2 Points Each) Fill in the blanks. State the period, amplitude, and midline of the function P.

(i) The period of $P(t)$ is _____.

(ii) The amplitude of $P(t)$ is _____.

(iii) The equation of the midline of $P(t)$ is _____.

(b) (3 Points Each)

(i) What is the maximum value of $P(t)$?

(ii) What is the value of $P(1)$?

(Similar to Quiz: Trigonometric Functions of Angles)

(5) (Optional: Extra Credit) (0.5 Point Each) Fill in the blanks.

(a) If $\cos(\theta) = \frac{3}{8}$ and θ is in the 4th quadrant, then the exact value of

(i) $\sin(\theta) =$ _____.

(ii) $\tan(\theta) =$ _____.

(iii) $\sec(\theta) =$ _____.

(iv) $\csc(\theta) =$ _____.

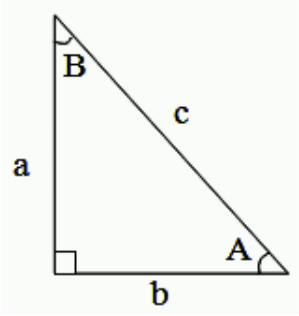
(v) $\cot(\theta) =$ _____.

(b) If $\theta = \frac{7\pi}{6}$, then

(i) $\sin(\theta) =$ _____,

(ii) $\cos(\theta) =$ _____.

(c) Consider the triangle below (Triangle not drawn to scale). Suppose $a = 5$ and $b = 7$. Find the exact values for each of the trig functions below.



(i) $\sin(A) =$ _____,

(ii) $\cos(A) =$ _____,

(iii) $\tan(A) =$ _____.