UNIVERSITY AT ALBANY
STATE UNIVERSITY OF NEW YORK

AMAT100 PreCalculus Exam 2A Spring 2025

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	9	
2	8	
3	8	
4	6	
5	9	
6	10	
7	6	
8**	4	
Total	56	

**Optional Extra Credit Problem

(Similar to HW5 Questions 2-6)

(1) Let $L(x)$ be a linear function where $L(-2) = -3$ and $L(2) = 3$.

(a) (3 Points) The slope of the linear function $L(x)$ is _____.

(b) (3 Points) The equation of the linear function is $L(x) =$ _____.

(c) (3 Points) Let $P(x)$ be a linear function perpendicular to $L(x)$ and passing through the point $(1, 0)$. The equation of this linear function is $P(x) =$ _____.

(Similar concepts to Practice Problems 8 and HW6 Questions 5-7)

(2) A UAlbany student, Mariah, is selling custom-designed phone cases in the campus center to raise money for their club. The profit, $P(n)$, they make in dollars is modeled by the function:

$$P(n) = -0.5n^2 + 15n,$$

where n is the number of phone cases they sell in a day.

(a) (4 Points) The number of phone cases Mariah needs to sell to maximize profit is _____ phone cases.

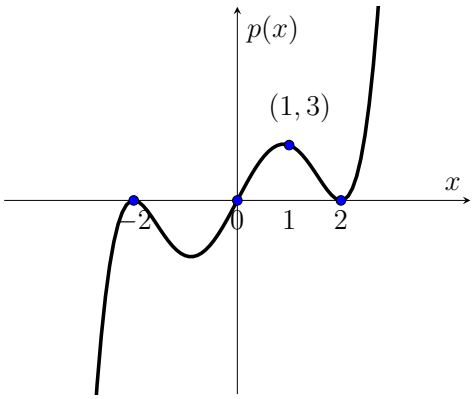
(b) (4 Points) The maximum profit Mariah can make in a day is _____ dollars.

Problem 2 Continued

(c) (**Optional Extra Credit Problem (4 Points)**) Determine the number of phone cases Mariah needs to sell to make a profit of exactly \$100.

(Similar concepts to Practice Problem 9 Question 3)

(3) (8 Points) Find a possible formula for the polynomial graphed below.



(Similar concepts to Practice Problems 10 Questions 1,2, Online HW 7 Questions 9, 10)

(4) The graph of $y = f(x)$ has

- Vertical asymptotes at $x = 3$ and $x = 5$.
- The x-intercept at $(-5, 0)$ and $(-4, 0)$.
- A horizontal asymptote of $y = \dfrac{1}{3}$.

(6 Points) Find ONE possible formula for the rational function f.

(Similar to HW8 and Practice Problems 13)

(5) (a) (3 Points) Find the domain of $f(x) = \log(2 - 7x)$. Write your answer using interval notation.

(b) (3 Points) The value of $\ln\left(\frac{1}{e^7}\right) =$ _____.

(c) (3 Points) The value of $100^{\log 5} =$ _____.

(Similar to HW8 Questions 5-9)

(6) (a) (5 Points) Expand the expression below as a sum or difference of logarithms with no exponents.

$$\log\left(\frac{a^{-3}b^5}{c^{-7}}\right)$$

(b) (5 Points) Solve for x:

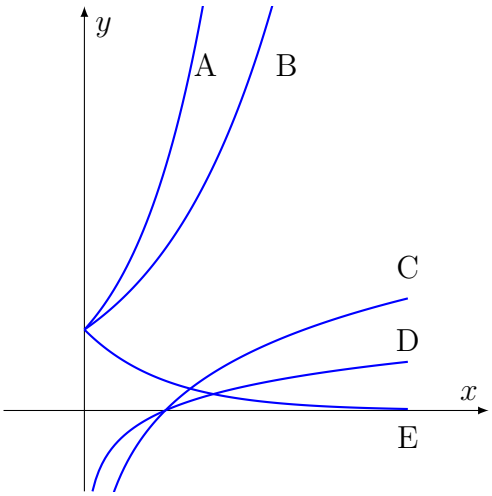
$$3\log(2x+6) = 6$$

(7) (Similar to Practice Problems 13, HW8)

(a) (6 Points) Solve for x:

$$11 \cdot 3^x = 5 \cdot 7^x$$

(b) (**Optional Extra Credit Problem (4 Points)**) Match the functions with with their graphs in the figure below.



$y = 2^x$ is the graph labeled _____.

$y = e^{-x}$ is the graph labeled _____.

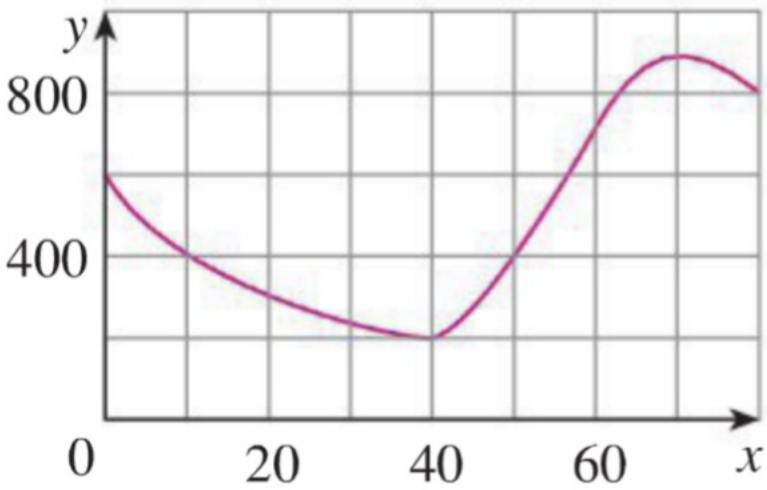
$y = 3^x$ is the graph labeled _____.

$y = \ln(x)$ is the graph labeled _____.

$y = \log(x)$ is the graph labeled _____.

(Optional Extra Credit Problem: 4 Points)

(8) Consider the graph of $f(x)$ below.



Calculate the average rate of change of $f(x)$ on the interval $[10, 40]$.