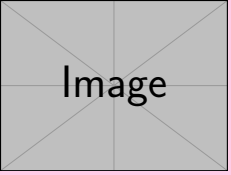
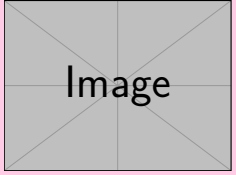
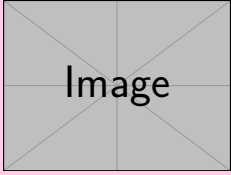




Division of Science **The City College of New York** **Department of Mathematics**

MATH195 – Precalculus

Fall 2024 Exam Three
Date: November 26th, 2024

First Name: _____ Last Name: _____

EMPLID: _____

Directions:

- **NO** notes, calculators, or other electronic devices allowed.
  All electronic devices must be turned off and placed out of sight or they will be confiscated for the duration of the exam.
- Read each problem carefully. Unless otherwise instructed, be sure to show your work.
- Remember that it is your **responsibility** to answer each question clearly and in a way that convinces the grader that you understand how to solve each problem.

– GOOD LUCK!

Answer all 7 questions. **You must show all of your work** as neatly and clearly as possible and indicate the final answer in the provided region for each non-graph question. For all graph questions, you should sketch your graph on the grid provided.

1. (10 points) Solve each equation below.

(a) (5 points) $3^{2x-1} = 5$, express your answer in terms of logarithms.

Write your answer in the box below:

(b) (5 points) $\log_8(x-5) + \log_8(x+3) = 1$

Write your answer in the box below:

2. (10 points) The rabbit population in a certain region has a relative (continuous) growth rate of 10 percent per year. It is estimated that the population in the year 2015 was 800.

(a) (4 points) Find a function that models the population t years after 2015 ($t = 0$ for 2015).

Write your answer in the box below:

(b) (6 points) After how many years will the rabbit population reach 160,000? Write your answer in the box below:

3. (12 points) Find the exact value of each trigonometric function.

(a) (4 points) $\cot 570^\circ$

Write your answer in the box below:

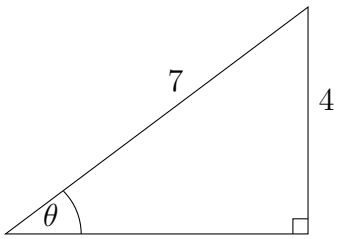
(b) (4 points) $\csc \frac{3\pi}{2}$

Write your answer in the box below:

(c) (4 points) $\sec \frac{5\pi}{6}$

Write your answer in the box below:

4. (5 points) Solve the triangle below. Find the angle θ using inverse trig. Leave your answer in terms of an inverse trigonometric function.



Write your answer in the box below:

$\theta =$

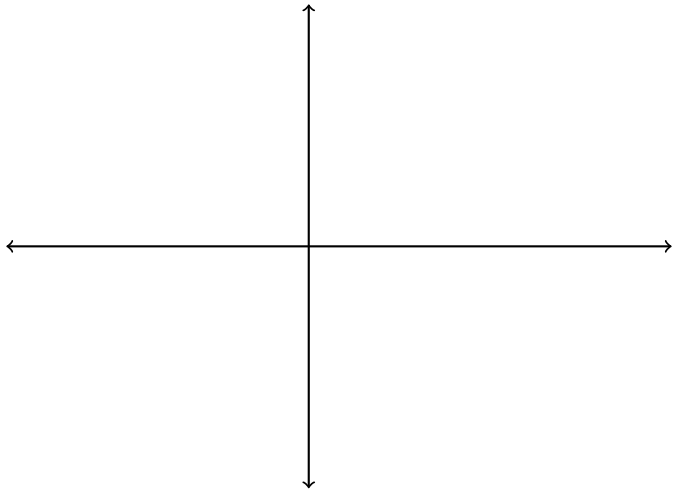
5. (5 points) Find the length s of a circular arc with a diameter of 8 meters and $\theta = 30°$.

Write your answer in the box below:

6. (5 points) Find cscx, if cosx $= -\frac{5}{13}$, x in Quadrant III.

Write your answer in the box below:

7. (10 points) For $f(x) = -\sin\left(x - \frac{\pi}{6}\right)$, find the amplitude, period, phase shift and graph one complete period.



Amplitude: _____	Period: _____	Phase shift: _____