

YOUR NAME: _____

CIRCLE YOUR TA's NAME: Mr. Ye Fang Ms. Shantala Mukherjee

Do all eleven problems. Each problem or part is worth the indicated number of points. There are 100 points altogether. Do not spend too much time on any one problem. There are eight printed pages in this exam, including this cover page. *Write neatly and show your work.*

| Page | Possible points | Your score |
|--------------|-----------------|------------|
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| TOTAL | 100 | |

Problem 3 (8 points) Solve for x the equation $\log(x) = \log(x + 6) - \log(x + 3) + \log(2)$.

Problem 4 (6 points) Solve for y the equation $4^{2y+3} = \frac{1}{8}$.

Problem 5 (8 points) Solve for x the equation $2^x - 8(2^{-x}) = 7$.

Problem 8 (12 points)

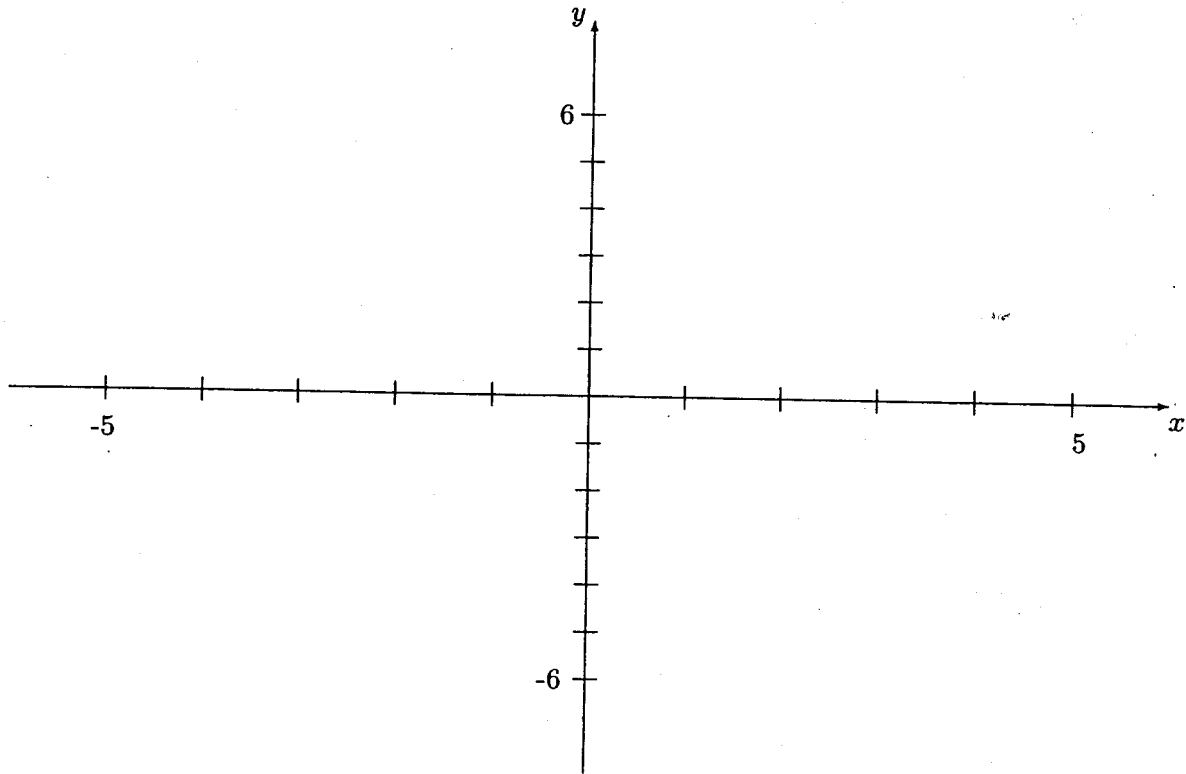
(a) (8 points) What are the domains of the two functions $f(x) = 3e^{-2x}$ and $g(x) = \log_2(x+2)$? Write your answers in interval form.

Domain of $f(x) =$

Domain of $g(x) =$

(b) (8 points) On the grid below, sketch the graphs of the two functions

$$y = f(x) = 3e^{-2x} \quad \text{and} \quad y = g(x) = \log_2(x+2).$$



(c) (4 points) Using information from the graphs in part (b), what can you say about the number of solutions to the equation $3e^{-2x} = \log_2(x+2)$? (*Do not try to solve the equation!*)

Problem 9 continued:

(e) (3 points) Is there a horizontal asymptote for the graph $y = f(x)$? If so, what is it?

(f) (8 points) Sketch the graph of $y = f(x)$:

