

Name _____

ID number _____ Date _____ Group _____

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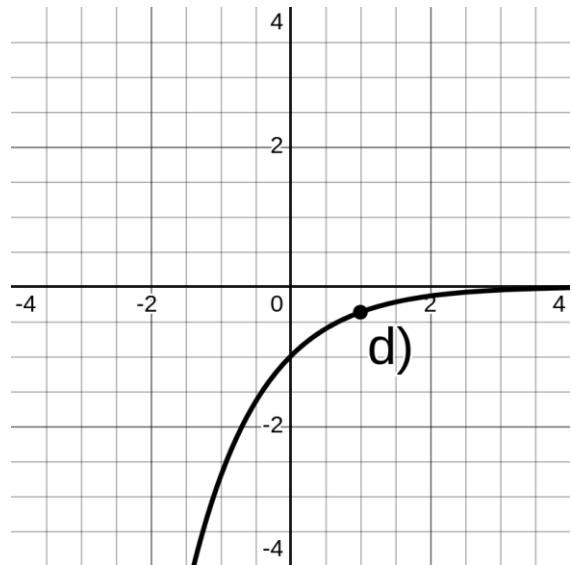
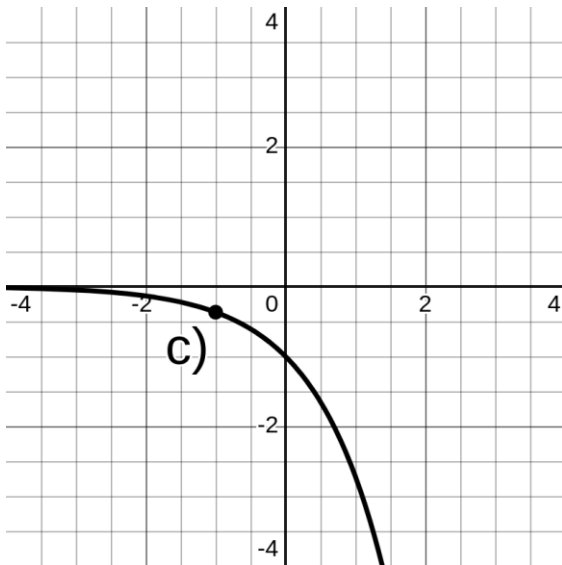
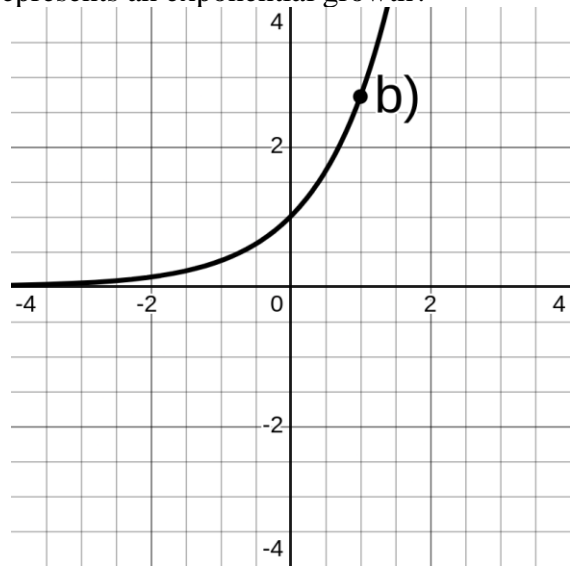
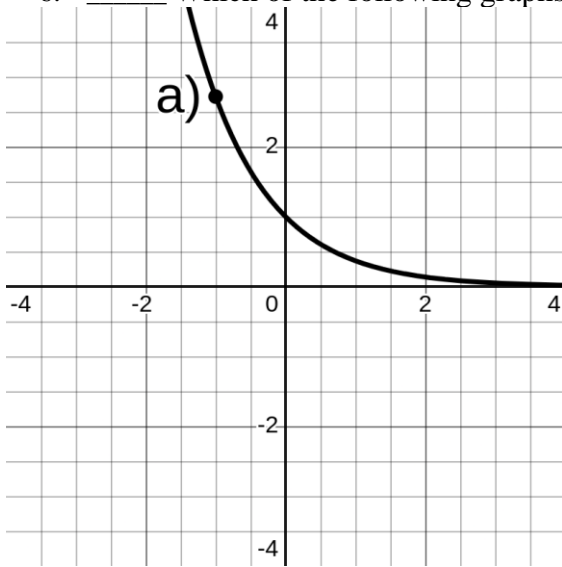
Signature

I. Read the following questions and identify the option that best answers each, then write its letter on the line. (5 points each)

1. _____ The range of the function $f(x) = e^{x-4} - 2$ is:
a) $f(x) \in (-4, \infty)$ b) $f(x) \in (-2, \infty)$ c) $f(x) \in [-2, \infty)$ d) $f(x) \in (2, \infty)$
2. _____ The graph of the function $f(x) = -2^x$ when x goes to infinity ($x \rightarrow \infty$):
a) The function goes to minus infinity ($f(x) \rightarrow -\infty$)
b) The function goes to plus infinity ($f(x) \rightarrow \infty$)
c) The function goes to zero ($f(x) \rightarrow 0$)
d) The function goes to two ($f(x) \rightarrow 2$)
3. _____ Which of the following equations shows a translation of 1 units right and 2 units upwards from the parent function $\ln(x)$ and tends to minus infinity ($f(x) \rightarrow -\infty$) when the domain tends to one ($x \rightarrow 1$).
a) $f(x) = \log_e(x + 2) - 1$ b) $f(x) = \ln(x - 1) + 2$
c) $f(x) = -\ln(x - 1) + 2$ d) $f(x) = \ln(x + 1) - 2$
4. _____ Which of the following statements represents the “Logarithm of a Product” property?
a) $\log_a(M) + \log_a(N) = \log_a(MN)$ b) $\log_a(M) - \log_a(N) = \log_a\left(\frac{M}{N}\right)$
c) $(P)[\log_a(M)] = \log_a(M^P)$ d) $-\log_a(M) = \log_a\left(\frac{1}{M}\right)$
5. _____ The domain of the function $f(x) = \log_3(x + 2) - 4$ is:
a) $x \in (4, \infty)$ b) $x \in (-4, \infty)$ c) $x \in (2, \infty)$ d) $x \in (-2, \infty)$

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6. _____ Which of the following graphs represents an exponential growth?



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II. Answer the following exercises. Frame or highlight your final answers.

7. Solved the following expressions for x . Include your procedures in an external paper (5 points each)

Expression	$\log_2 \left(\frac{x}{2} \right) = 3$
Procedure	
Answer	

Expression	$e^{2x} = 2$
Procedure	
Answer	

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III. Solve the following exercises in an orderly and clear manner. Underline or frame your final answer. Include the WHOLE procedure. This is evidence for your answers, **missing procedures will render the answer invalid.**

8. **Write and use the change of base formula** to compute the following. Report the numeric value with 6 decimals. (5 points)

Expression	$\log_9 \left(\frac{1}{9} \right)$
Procedure	
Answer	

9. Use the Laws of logarithms to expand the following expression. (10 points)

Expression	$\log \left(\frac{xy^3}{z^2} \right)$
Procedure	
Answer	

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10. Use the properties of logarithms to condense the following expression. (15 points)

Expression	$\log \left[\frac{\ln(x^2)}{4 \ln(x)} \right] - \log[2 \ln(x)]$
Procedure	
Answer	

11. Determine the horizontal asymptote for the following function. (10 points)

Expression	$f(x) = \frac{1}{2}(e^x - 2)^2$
Procedure	
Answer	

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12. Finde the critical points of the following functions. (10 points)

Expression	$f(x) = \exp[(x - 4)^2]$	$g(x) = \ln \left[\frac{3}{2}x \right]$
Procedure		
Answer		

13. Sketch a graph of $f(x) = e^x$ and $g(x) = \ln(x)$ (10 points)

