

Name _____

ID number _____ Date _____ Group _____

“Adhering to the Code of Ethics for students of the Tec de Monterrey, I pledge to follow the precepts of academic honesty in this evaluation by not using unauthorized or illicit resources to solve it.”

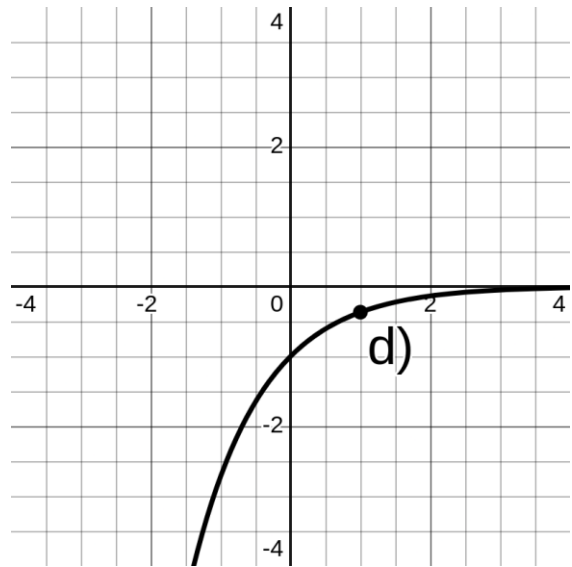
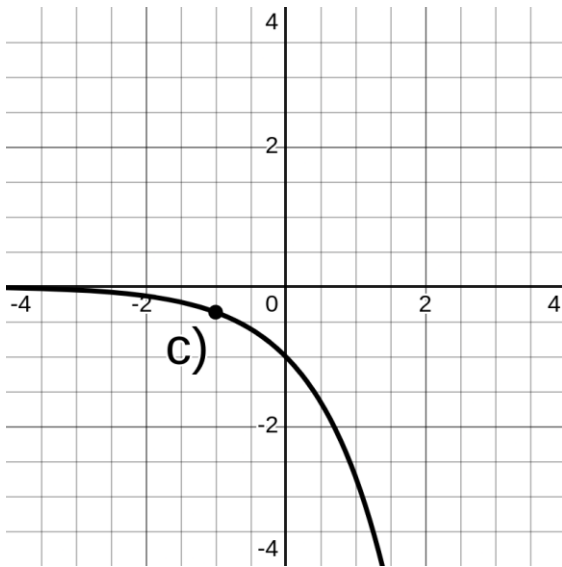
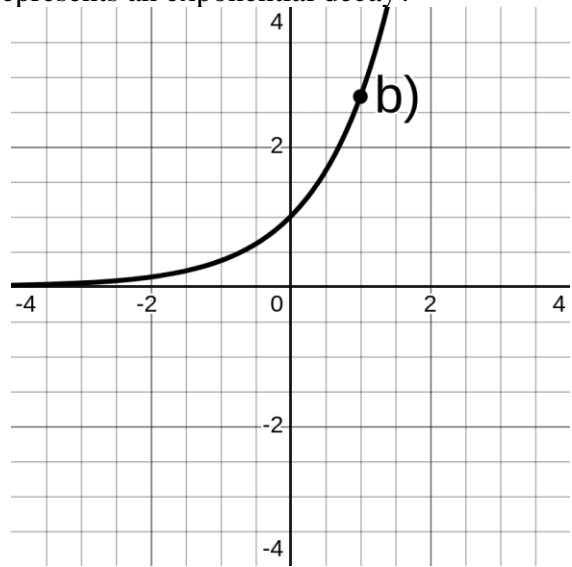
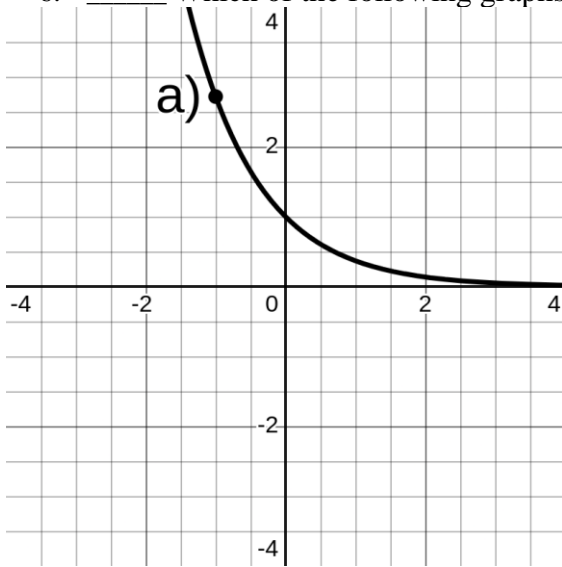
Signature

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 $f(x) = e^{x-2} + 4$ is:
a) $f(x) \in (4, \infty)$ b) $f(x) \in (-2, \infty)$ c) $f(x) \in [4, \infty)$ 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 2 units left and 1 units downwards 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) $f(x) = \ln(x + 2) - 1$ 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 Power” 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 $f(x) = \log_3(x + 4) - 2$ is:
a) $x \in (4, \infty)$ b) $x \in (-4, \infty)$ c) $x \in (2, \infty)$ d) $x \in (-2, \infty)$

Tecnológico de monterrey
Algebraic and Trascendental Functions

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



Tecnológico de monterrey
Algebraic and Trascendental Functions

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

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

Expression	$\exp[x^2] + 2 = 1$
Procedure	
Answer	

Expression	$2 \ln(x) - 1 = 0$
Procedure	
Answer	

Tecnológico de monterrey
Algebraic and Trascendental Functions

III. Solve the following exercises in an orderly and clear manner. 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	$\log_8 \left(\frac{1}{8} \right)$
Procedure	
Answer	

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

Expression	$\ln \left(\frac{x^3 y}{z^5} \right)$
Procedure	
Answer	

Tecnológico de monterrey
Algebraic and Trascendental Functions

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

Expression	$\log \left[\frac{\ln(x^6)}{6 \ln(x)} \right] - \log[8 \ln(x)]$
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	

Tecnológico de monterrey
Algebraic and Trascendental Functions

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

Expression	$f(x) = \exp[(x - 4)(x + 4)]$	$g(x) = \ln \left[\frac{1}{x^2} + 2 \right]$
Procedure		
Answer		

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

