Review

SM3 Test Review Unit 11 (2023-2024)

SCORE: /

Name _____ **Date** _____ **Period**_____

Evaluate the logarithm without a calculator. Show work!

1. $\log_6\left(\frac{1}{36}\right)$
2. $10^{\log 5}$
3. $\log 1000$
4. $\log_{21}\sqrt{21}$
5. $\ln\frac{1}{\sqrt{e}}$
6. $\log_7 343$
7. $\log_6 6^2$
8. $e^{\ln 20}$
9. $\log_8\frac{1}{64}$
10. $\ln e$
11. $\log_{12}1$

Find the following using a calculator. Round to the nearest ten thousandths.

12. $\log 32$
13. $\ln 0.98$
14. $\log(-3)$
15. $5^{3.2}$

Rewrite as an exponential function.

16. $\log x = 4$
17. $\ln 5 = x$
18. $\log_3 243 = 5$

Rewrite as a logarithmic function.

19. $5^4 = 625$
20. $10^x = 100$
21. $e^2 = x$

Solve each function by using the one-to-one principle (make the bases the same). DO NOT use logarithms!

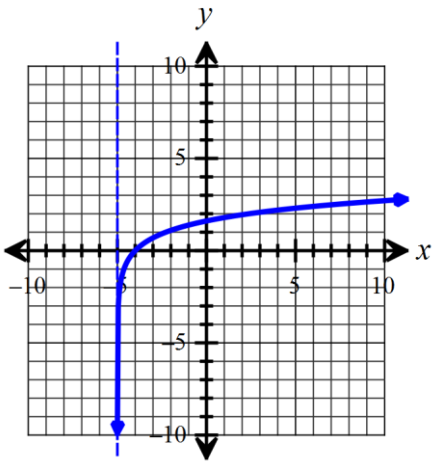
22. $2^{3x} = 8$
23. $3^{2x-1} = 3^5$

Describe how to transform the graph of the basic function $g(x)$ into the graph of the given function $f(x)$.

24. $g(x) = \ln x;\ \ f(x) = \ln(-x) - 7$

25. $g(x) = 2^x;\ \ f(x) = 3 \cdot 2^{x+3}$

26. Determine the function that best describes the given graph.



a. $y = \ln x - 5$

c. $y = \ln x + 5$

b. $y = \ln(x - 5)$

d. $y = \ln(x + 5)$

Rewrite the expression as a sum or difference or multiple of logarithms.

27. $\log_2\left(\frac{5x}{y}\right)$

28. $\log_8\left(\frac{2x-3}{x^4}\right)$

Use the product, quotient and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

29. $\log_3 6 - \log_3 a$

30. $4\log x + 2\log y$

31. $2\log_4 3 + \log_4(x-5) - 7\log_4 x$

Write the change of base rule to find the logarithm to the nearest ten thousandths.

32. $\log_{3.4} 210$

33. $\log_4 3.8$

Solve each equation. Show work. Round to the nearest thousandths if necessary.

34. $\log_4 x = \frac{1}{2}$

35. $3e^{(2x-7)} = 8$

36. $\log_2(x+2) = 5$

37. $\log\left(\frac{3}{5}x - 2\right) = 5$

38. $-10^{x-2} + 8 = -20$

39. $\log_5 4x = \log_5 10$

40. $\log_3(x+4) - \log_3 4 = \log_3 22$

41. $\log_5 4 + \log_5(3x-4) = 2$

42. $4^{(x-5)} + 4 = 9$

43. $5 - \ln x = 8$

Use the given function *f* to:

(*a*) Find the domain of *f* and any asymptotes of *f*. (b) Write the transformations. (c) Graph *f*. (d) From the graph determine the range.

Use transformations and a table of values for at least 3 key points to get the graphs. No graphing calculators!

44. $f(x) = \left(\frac{1}{2}\right)^{x-1}$

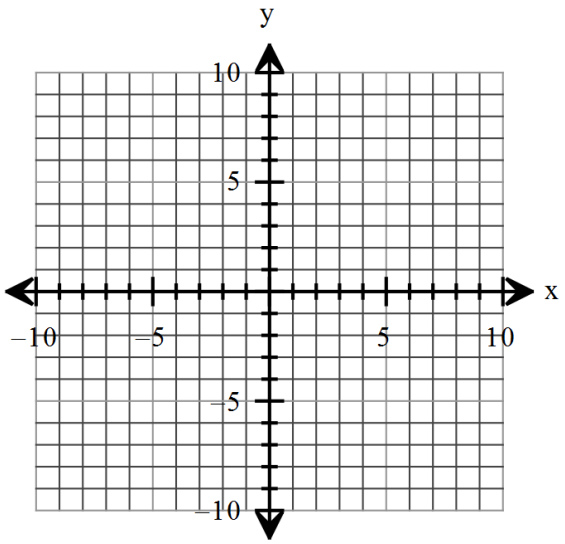
Domain:

Asymptote:

Key points and transformations:

x	$f(x)$

x	$f(x)$



Range:

45. $f(x) = -3^x + 2$

Domain:

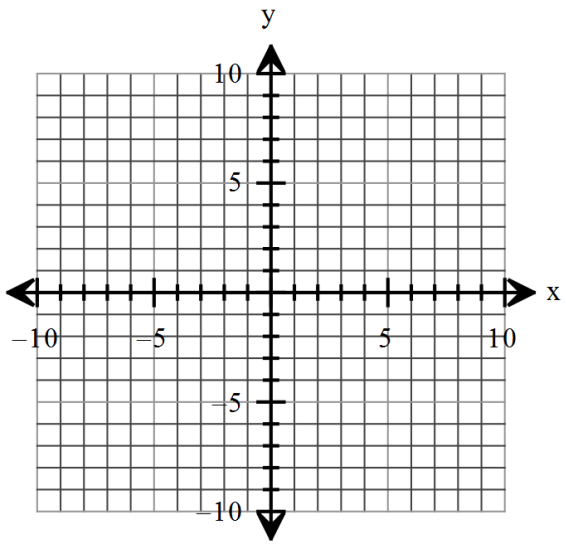
Asymptote:

Key points and transformations:

x	$f(x)$

x	$f(x)$

Range:



46. $f(x) = \log_2 x + 1$

Domain:

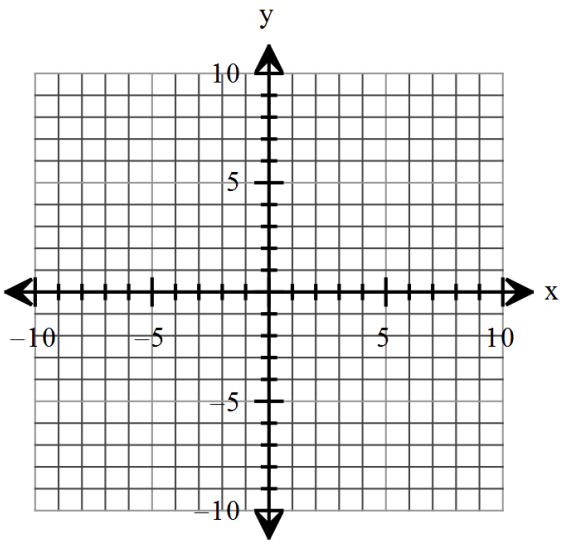
Asymptote:

Key points and transformations:

x	$f(x)$

x	$f(x)$

Range:



47. $f(x) = 2\log_3(x+1)$

Domain:

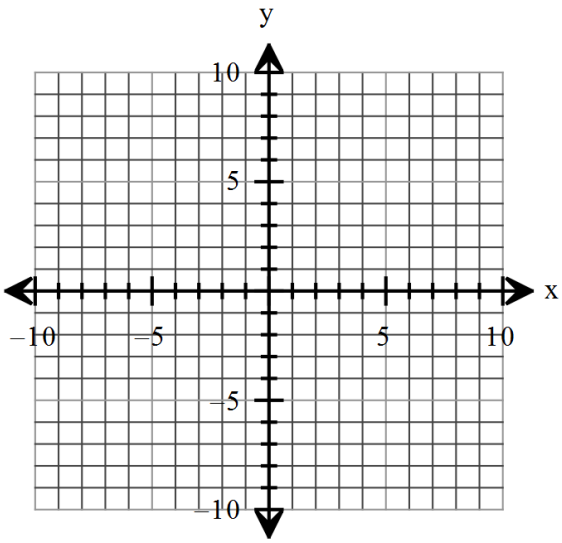
Asymptote:

Key points and transformations:

x	$f(x)$

x	$f(x)$

Range:



Find the inverse of each function. Show work.

48. $f(x) = 2x - 3$

49. $f(x) = \frac{x^3-2}{4}$

50. $f(x) = \sqrt{x+3}$

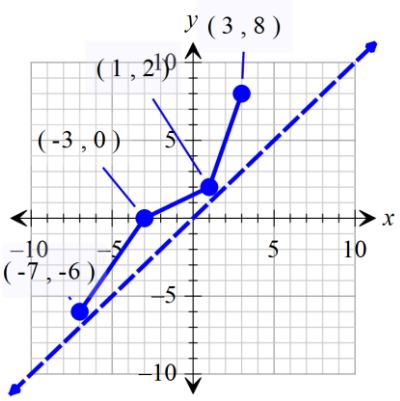
51. $f(x) = 2(x+2)^2 - 3$

52. $f(x) = -\sqrt[3]{3x} + 5$

53. $f(x) = \frac{3x+5}{2x-1}$

54. Find the domain of $f(x) = \ln(10 - x)$. Show work!

55. Use the graph of the given one-to-one function to sketch the graph of the inverse function. For convenience, the graph $y = x$ is also given.



56. Find the amount which results from the following investment. $10,000 invested at 8% compounded quarterly after a period of 5 years. Round to the nearest cent. $\boldsymbol{A = P \cdot \left(1 + \frac{r}{n}\right)^{nt}}$

57. The formula for a small bacteria population is $P(t) = 400e^{.23t}$ After how many years will the population reach 2000? Round to the nearest year.