

HW34: Unit 4 Test Review

Evaluate the following without a calculator.

1. $\log_4 64 =$	2. $\log\left(\frac{1}{\sqrt{10}}\right) =$	3. $\log_2\left(\frac{1}{64}\right)$
4. $\log_4 192 - \log_4 3 =$	5. $\log_{\frac{1}{3}} 27 =$	6. $\log(10,000) =$

Use properties of logs to expand or condense the logarithm as much as possible. Where possible, evaluate the logarithmic expressions without using a calculator.

7. Expand. $\log_5\left(\frac{2\sqrt{y}x^3}{z^4}\right)$
8. Expand. $\ln\frac{ex^3}{(x-4)^2}$
9. Condense. $3(\log x - \log y) + 4\log x$
10. Condense. $\frac{1}{2}\ln y + 3\ln x - 3[\ln(x+2) + \ln 2]$

Solve each equation. Find the exact and rounded answers. Check for extraneous solutions when necessary.

11. $25^{x-3} = 125^{2x+1}$

12. $7^{x+3} = \left(\frac{1}{49}\right)^{2x+1}$

13. $7 - 2e^x = 5$

14. $3(5^{x-1}) = 21$

15. $5\log(x-2) = 11$

16. $3\ln(x-2) = 10$

17. $\ln 5 = \ln(x-1) - \ln(x+1)$

18. $\ln 5 + \ln(x+3) = 1$

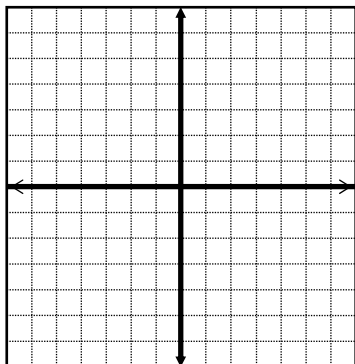
19. $\log_2 5 - 1 = \log_2(x+1)$

20. $\log_3(x+2) + \log_3 x = 1$

Graph. Write the equation of the asymptote and give the domain and range in interval notation.

21. $f(x) = 3\left(\frac{1}{2}\right)^{x-2}$

Asy:

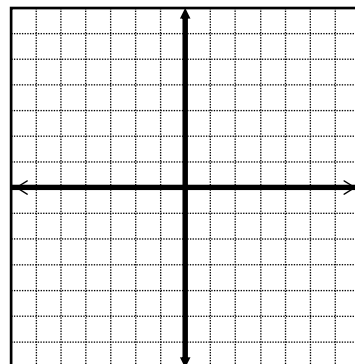


Domain:

Range:

22. $f(x) = \ln(x-4)$

Asy:

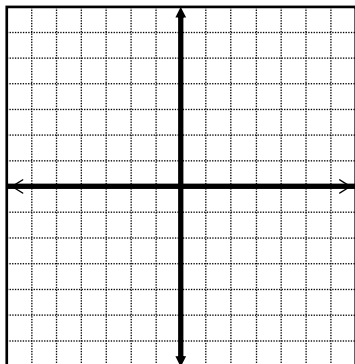


Domain:

Range:

23. $f(x) = \log_2(x+2) - 1$

Asy:

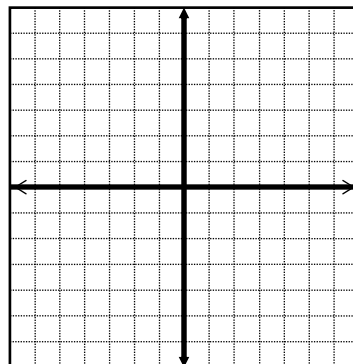


Domain:

Range:

24. $f(x) = e^{x-3} + 1$

Asy:



Domain:

Range:

Solve.

25. Find the amount of an investment of \$5,000 at 4% compounded monthly for 8 years.

26. Find the amount of an investment of \$10,000 at 6% compounded continuously for 5 years.

Answers

1. 3

2. $-\frac{1}{2}$

3. -6

4. 3

5. -3

6. 4

7. $\log_5 2 + \frac{1}{2}\log_5 y + 3\log_5 x - 4\log_5 z$

8. $1 + 3\ln x - 2\ln(x - 4)$

9. $\log \frac{x^7}{y^3}$

10. $\ln \frac{x^3 \sqrt{y}}{8(x+2)^3}$

11. $-\frac{9}{4}$

12. -1

13. 0

14. $\frac{\log 7}{\log 5} + 1 \approx 2.209$

15. $10^{(11/5)} + 2 \approx 160.489$

16. $e^{(10/3)} + 2 \approx 30.032$

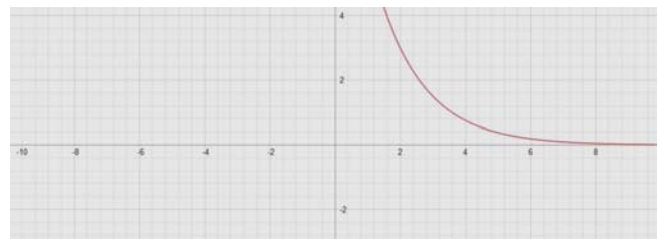
17. No solution $\left(-\frac{3}{2} \text{ is extraneous}\right)$

18. $\frac{e-15}{5} \approx -2.456$

19. $\frac{3}{2}$

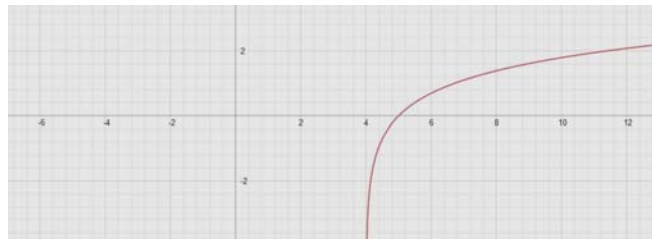
20. 1 (-3 is extraneous)

21.



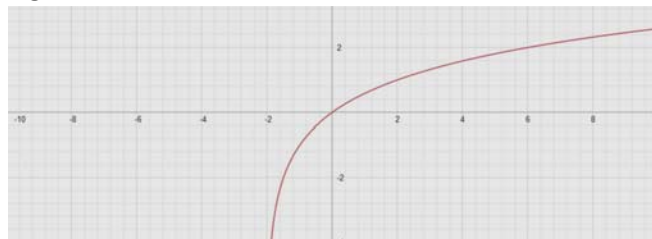
Asy: $y = 0$ Domain: $(-\infty, \infty)$ Range: $(0, \infty)$

22.



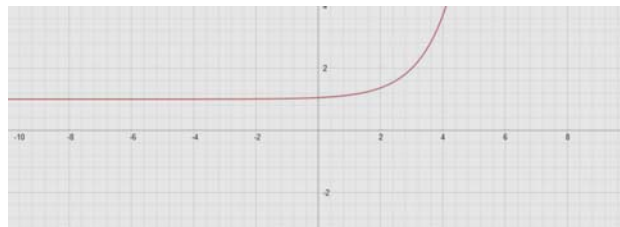
Asy: $x = 4$ Domain: $(4, \infty)$ Range: $(-\infty, \infty)$

23.



Asy: $x = -2$ Domain: $(-2, \infty)$ Range: $(-\infty, \infty)$

24.



Asy: $y = 1$ Domain: $(-\infty, \infty)$ Range: $(1, \infty)$

25. \$6,881.98

26. \$13,498.59