

Unit 2 Review - Exponential & Logarithmic Functions

Converting Between Logarithmic and Exponential Forms

Rewrite in Logarithmic Form

1. $6^3 = 216$ $\log_6 216 = 3$
2. $0.04 = 5^{-2}$ $\log_5 0.04 = -2$

Rewrite in Exponential Form

3. $\ln 7 = 1.946$ $e^{1.946} = 7$
4. $\log_3 9 = 2$ $3^2 = 9$

Evaluating Logarithms

5. $\log_2 8$ 3
6. $\log 56$ 1.75
7. $\ln 12$ 2.48

Expanding the Logarithmic Expressions

8. $\log \frac{w^5 x}{yz^9}$
 $5 \log w + \log x - \log y - 9 \log z$
9. $\log_8 4ab^2$
 $\log_8 4 + \log_8 a + 2 \log_8 b$
10. $\log_2 (cd)^3$
 $3 \log_2 c + 3 \log_2 d$

Condense the Logarithmic Expressions

11. $\log_5 2 + \frac{1}{3} \log_5 k - 3 \log_5 m$
 $\log_5 \frac{2 \sqrt[3]{k}}{m^3}$
12. $\frac{1}{2} \log_9 2 - \log_9 x - 3 \log_9 3 + \log_9 y$
 $\log_9 \frac{\sqrt{2y}}{3^3 x}$ ~~FOR~~ $\log_9 \frac{\sqrt{2y}}{27x}$

Solving Logarithmic Equations

8. $\log_3 (2x + 7) = 4$ 37
9. $\ln (2x - 8) = 3$ $\frac{e^3 + 8}{2}$
10. $\log_x 16 = 2$ $x = \pm 4$ ($x = 4$)
-4 is extraneous
11. $\log_4 3x^2 + \log_4 2x = 4$ $\frac{512}{3} = 170.67$
12. $\log_8 (6x - 4) = \log_8 (2x + 12)$
 $x = 4$
13. $\log x - \log (x - 21) = 2$
 $x = \frac{2100}{99} = \frac{700}{33}$

Solving Exponential Equations

15. $e^{3x} = 11$ $\frac{\ln 11}{3}$
16. $3^{2x} - 6 = 17$
 $x = \frac{\log_3 23}{2}$
18. $10^x = 4^{2x-3}$ $x = \frac{-3 \log 4}{1 - 2 \log 4}$
19. $7^{x+3} = 40$
 $\log_7 40 - 3$

Graphing Exponential & Logarithmic Functions

20. $y = 3^x - 1$

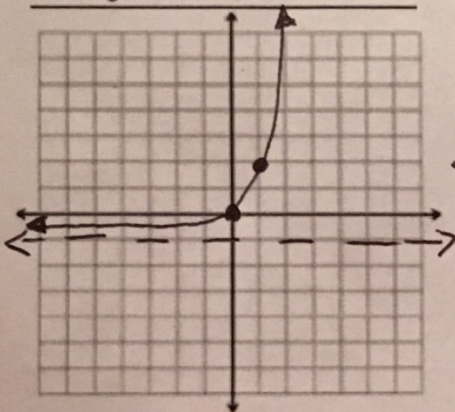
Asymptote: $y = -1$

Domain: $(-\infty, \infty)$

Range: $(-1, \infty)$

Transformation(s):

down 1



21. $y = (2)^{x-2} + 2$

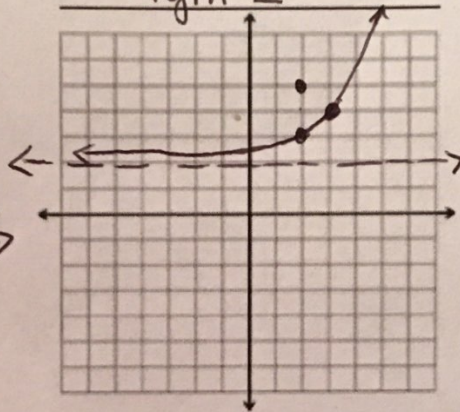
Asymptote: $y = 2$

Domain: $(-\infty, \infty)$

Range: $(2, \infty)$

Transformation(s):

up 2
right 2



22. $y = \log_4(x + 1)$

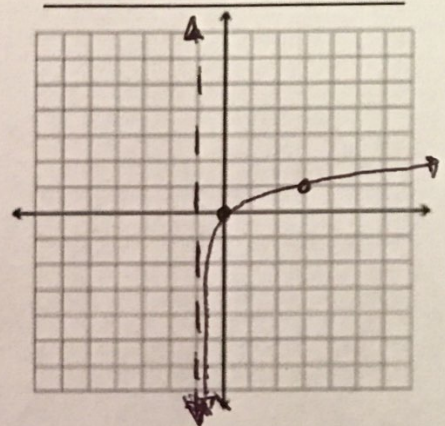
Asymptote: $x = -1$

Domain: $(-1, \infty)$

Range: $(-\infty, \infty)$

Transformation(s):

left 1



Mixed Applications Practice (Growth, Decay and Compound Interest)

23. How much money will be available in 7 years if \$400 is invested at 3% interest compounded continuously?

\$ 493.47

24. The value of an iPod purchased for \$300 decreases by 6% each year. How long until the iPod is worth \$90?

19.46 years

25. How long will it take for your bank account to triple if the money is invested at 4% interest compounded monthly?

27.51 years

26. If a gallon of milk costs \$3 now and the price is increasing by 10% each year, how long before milk costs \$10 per gallon?

12.63 years

27. How much money must be invested at 6.5% interest compounded quarterly for \$50,000 to be available in 7 years?

\$ 31,838.63

28. The number of bacteria present in a colony is 180 at 11 a.m. and the number of bacteria doubles every hour. How many will be present at 8 p.m.?

92,160 bacteria

29. How long will it take to have \$1400 if \$900 is invested at 7% interest compounded continuously?

6.31 years