Honors Algebra 3-4 Name Key

3.1-3.3 Practice Period _____

1. Without using a calculator, sketch the graph of $f(x) = 3^{(x-2)} - 1$

Identify:

y-intercept: $(0, -\frac{8}{9})$

asymptote: $y = -1$

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

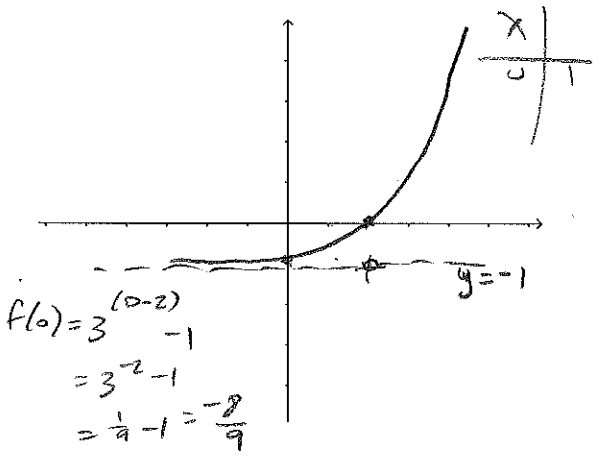
range: $(-1, \infty)$

x intervals where f(x) is increasing: $(-\infty, \infty)$

x intervals where f(x) is decreasing: none

shift right 2, down 1

$y = 3^x$



$f(0) = 3^{(0-2)} - 1$

$= 3^{-2} - 1$

$= \frac{1}{9} - 1 = -\frac{8}{9}$

2. $5000 is invested in an account at a rate of 4% compounded quarterly. What is the balance at the end of 4 years?

$A = P(1 + \frac{r}{n})^{nt} = 5000(1 + \frac{.04}{4})^{4(4)} = \$5862.89$

3. Jill wants to have $32,000 in her bank account at the end of 20 years. If the account pays 5% interest and is compounded continuously, how much money will Jill need to put into her account initially in order to reach her goal?

$A = Pe^{rt}$

$32000 = Pe^{.05(20)}$

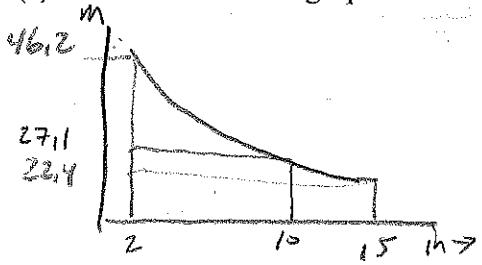
$\frac{32000}{e^1} = \frac{Pe^1}{e^1}$

$P = \frac{32000}{e} = \$11772.14$

4. The number of miles, m, of roads cleared of snow is approximated by the model $m = 25 - \frac{13\ln\left(\frac{h}{12}\right)}{\ln 3}$

where h is the depth of snow in inches and $2 \le h \le 15$.

(a) Use a calculator to graph the function:



(b) How many miles of road can be cleared if the snow is 10 inches deep?

27 miles

5. Evaluate: $\log_a a^3$

$a^x = a^3$

$x = 3$

6. Evaluate: $\log_7 1$

$7^x = 1$

$x = 0$

7. Evaluate: $\ln e^7$

$\ln e^7 = 7$

cancel

8. Write in exponential form: $\log_4 16 = 2$

$4^2 = 16$

9. Evaluate (to 3 decimal places): $\log_4 24$

$= \frac{\ln 24}{\ln 4} \approx 2.292$

10. Write as a sum, difference, or multiple of logarithms: $\log_2\left(\frac{2x^3y^2}{z^4}\right)$

$= \log_2 2 + \log_2 x^3 + \log_2 y^2 - \log_2 z^4$

$= \log_2 2 + 3\log_2 x + 2\log_2 y - 4\log_2 z$

11. Write as a sum, difference, or multiple of logarithms: $\ln\sqrt[3]{\frac{x^2}{2y^4}} = \ln\left(\frac{x^2}{2y^4}\right)^{1/3}$

$= \frac{1}{3}[\ln x^2 - \ln 2 - \ln y^4]$

$= \frac{1}{3}[2\ln x - \ln 2 - 4\ln y]$

$= \frac{2}{3}\ln x - \frac{1}{3}\ln 2 - \frac{4}{3}\ln y$

12. Write as the logarithm of a single quantity: $\frac{1}{2}[5\log_3 x + 2\log_3 y - \log_3 w] = \frac{1}{2}[\log_3 x^5 + \log_3 y^2 - \log_3 w]$

$= \frac{1}{2}\log_3\left(\frac{x^5y^2}{w}\right) = \log_3\left(\frac{x^5y^2}{w}\right)^{1/2}$

$= \log_3\sqrt{\frac{x^5y^2}{w}}$

13. Solve for x: $\log_4 2x = \log_4 10$

$2x = 10$

$x = 5$

14. Solve for x: $4^{x-2} = 16^x$

$4^{x-2} = (4^2)^x$

$4^{x-2} = 4^{2x}$

$x - 2 = 2x$

$-2 = x$

15. Evaluate: $\log_2 24^{4.2}$

$4.2\log_2 24$

$4.2\frac{\ln 24}{\ln 2} \approx 19.257$

16. Evaluate: $\log_4 27$

$\frac{\ln 27}{\ln 4} \approx 2.377$

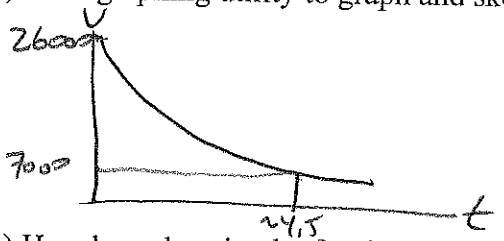
17. Evaluate: $\log_2 6 - \log_2 3$

$\log_2\left(\frac{6}{3}\right)$

$\log_2 2 \quad 2^x = 2 \quad x = 1$

18. After t years, the value of a car that originally cost \$26,000 is $V(t) = 26{,}000\left(\frac{3}{4}\right)^t$

(a) use a graphing utility to graph and sketch the function:



(b) How long does it take for the value of the car to drop below \$7000?

~4.5 years

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3.1-3.3 Practice

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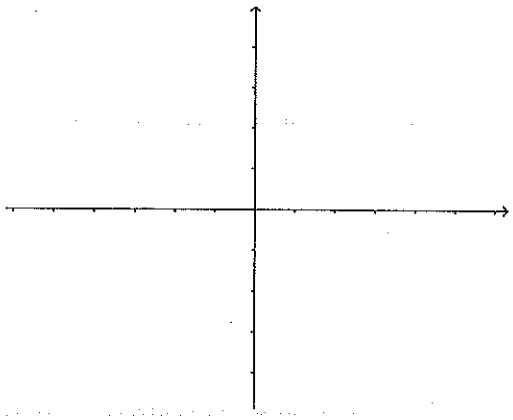

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