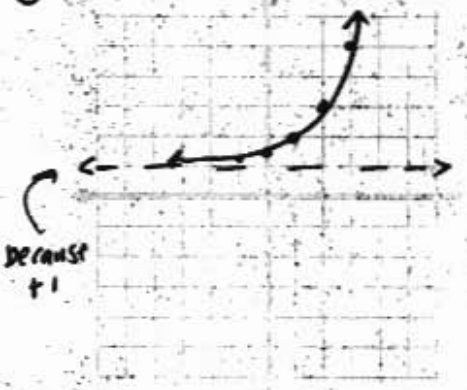
Name: Key Date:

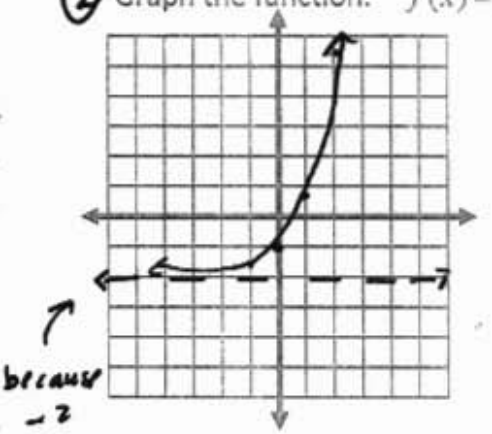
① $f(x) = 2^{x-1} + 1$



x	y
3	5
2	3
1	2
0	1½
-1	1¼

because +1

② Graph the function. $f(x) = e^x - 2$



x	y
0	-1
1	.718
2	5.39
-1	-1.63

because -2

③ $5^{\frac{x-1}{3}} = \sqrt[3]{5}$ because $\sqrt[n]{x} = x^{\frac{1}{n}}$

$5^{(x-1)/3} = 5^{1/3}$

$\left(\frac{x-1}{3} = \frac{1}{3}\right)3$

$x-1 = 1$

$x = 2$

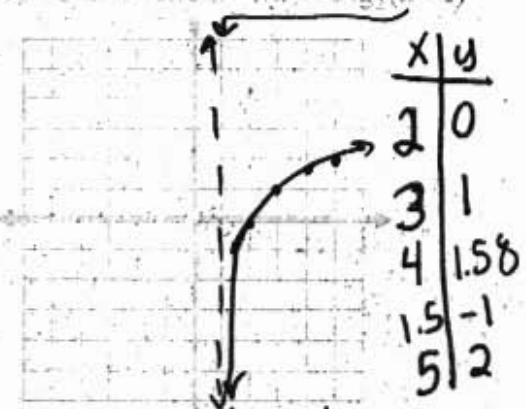
4. The exponential equation $A = 108.3e^{0.012t}$ describes the population of a particular country in millions t years after 2003. What will the population of the country be in 2009?

$A = 1083e^{0.012t}$

in 2009 $t = 2009 - 2003 = 6$

$A = 108.3e^{.012(6)} \approx 116.385$

5. Graph the function. $h(x) = \log_2(x-1)$



x	y
2	0
3	1
4	1.58
1.5	-1
5	2

$y = \log_2(x-1) \rightarrow 2^y = x-1$

$x = 2^y + 1$

6. Find the domain of $f(x) = \log_4(x+2)$.

$x+2 > 0$ $\{x \mid x \in R, x > -2\}$

7. Find the exact value without using a calcula $\log_3 9$

$\log_3 9 = y$ $3^y = 9$ $\boxed{y=2}$

8. Find the exact value of $6^{\log_6 15}$.

$6^{\log_6 15} = 15$

9. Expand $\log_3\left(\frac{27}{\sqrt{x-2}}\right)$

$\log_3 27 - \log_3 \sqrt{x-2} = \log_3 3^3 - \log_3 (x-2)^{1/2}$

$= 3\log_3 3 - \frac{1}{2}\log_3(x-2)$

or $\boxed{3 - \frac{1}{2}\log_3(x-2)}$

10. Condense $\frac{1}{2}\left[\log_5(x+1) + \log_5 y\right]$

$\frac{1}{2}(\log_5 (x+1)y)$

$= \log_5 (xy+y)^{1/2}$

$= \log_5 \sqrt{xy+y}$

11. Use change of base to evaluate $\log_{\frac{1}{2}} 65$ to three decimal places.

$\log_{1/2} 65 = \frac{\log 65}{\log \frac{1}{2}} = -6.02237\ldots$

-6.022

12. Find the value of $5,000 invested at 3.2% for 10 years, compounded...

a. quarterly b. monthly c. continuously

$y = P(1+\frac{r}{n})^{rt}$

(a) $y = 5{,}000 \cdot (1 + \frac{.032}{4})^{4 \cdot 10}$

$\approx \$6876.88$

(b) $y = 5{,}000(1 + \frac{.032}{12})^{12 \cdot 10}$

$\approx \$6882.71$

(c) $y = Pe^{rt}$

$= 5{,}000 \cdot e^{.032(10)}$

$\approx \$6885.64$

13. Write in exponential form a. $\log_3 81 = 4$ b. $\ln x = 5$

a) $\log_3 81 = 4$ $\boxed{3^4 = 81}$ b) $\log_e x = 5$ $x = e^5$

14. Write in logarithmic form a. $e^x = 7$ b. $5^4 = y$

a) $\log_e 7 = x$ $7 = e^x$ b) $\log_5 y = 4$