10. Find the value of $\log_e 15$. Write the expression that you entered into your calculator to determine the answer.

$\ln 15$ or $\frac{\log 15}{\log e}$ 2.708

11. You would like to find a bank account in which your money will double in 15 years. If the interest is compounded continuously, what must the interest rate be for that account?

$2 = 1e^{r \cdot 15}$

$\ln 2 = 15 \cdot r \cdot \cancel{\ln e}$

$\frac{\ln 2}{15}$

$r \approx 4.62\%$

Find r

12. A certain bacteria will triple in 6 hours. If you started with 5 bacteria, and you now have 2341, how much time has elapsed?

$9 = 3e^{r \cdot 6}$

$3 = e^{6r}$

$\ln 3 = 6r \cdot \cancel{\ln e}$

$\frac{\ln 3}{6} = r$

$r \approx .1831$

$2341 = 5e^{.1831t}$

$468.2 = e^{.1831t}$

$\ln 468.2 = .1831t \cdot \cancel{\ln e}$

$33.58 = t$

13. Graph the equation $f(x) = \log_2 x$ and its inverse by plotting points on the axes to the right. Be sure to label the graphs to signify the original from the inverse.

x	y
1/4	-2
1/2	-1
1	0
2	1
4	2
8	3

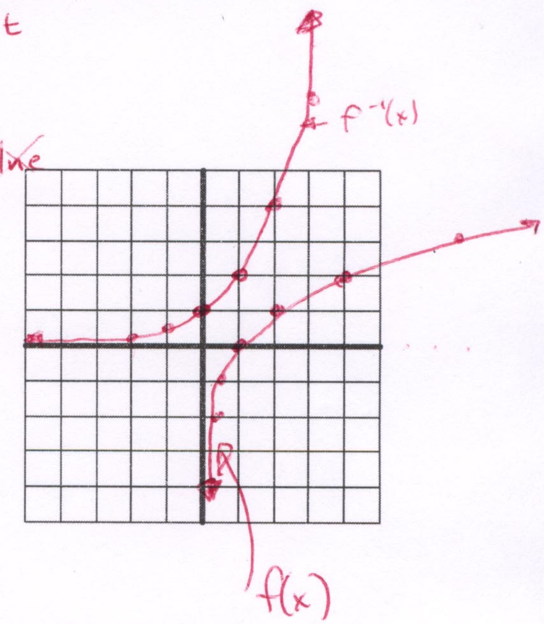
$y = \log_2 x$

$2^y = x$

$f^{-1}(x) =$

flip y + x value

x	y
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8



15. The formula $P_n = P\left[\frac{1-(1+i)^{-n}}{i}\right]$ is used by banks to compute the amount of a loan. Where P_n represents the loan amount, P the monthly payment, i the interest rate per payment, and n the number of payments.

Paul recently purchased a new home and had to take a loan out for $85,000. If the loan was for 30 years at a 6% interest rate, what are his monthly payments?

$85{,}000 = P\left[\frac{1-\left(1+\frac{.06}{12}\right)^{-360}}{\frac{.06}{12}}\right] \rightarrow 85{,}000 = P \cdot 166.79$

$\boxed{\$509.62}$