- 1. Greta is hatching a plan to buy a house and move to <u>Bora Bora</u>. She knows (based on her newly acquired knowledge of compound interest) that if she invests now, her money will grow over time using the equation $V(x) = V(0)(1+r)^x$, where V(x) =value of her money after x years, V(0) = initial amount invested and r = the interest rate she will earn.
 - a. Explain why the calculation uses 1+r to calculate the growth in her account

original + interest

b. Greta does research and finds that one of the highest yielding stocks for 2016 (Fifth Street Financial) paid 13% annual return. If she invested \$1000 now at that rate, what would be the value of her investment after 20 years?

 $f(x) = 1000(1 + .13)^{20} + 11,523$

c. Okay, so it turns out that Bor Bora real estate is expensive:

http://www.sothebysrealty.com/eng/sales/pyf. Greta figures that she should be able to get something decent for \$500,000. Determine how much she would need to invest now (still at 13% for 20 years) to afford a \$500,000 property.

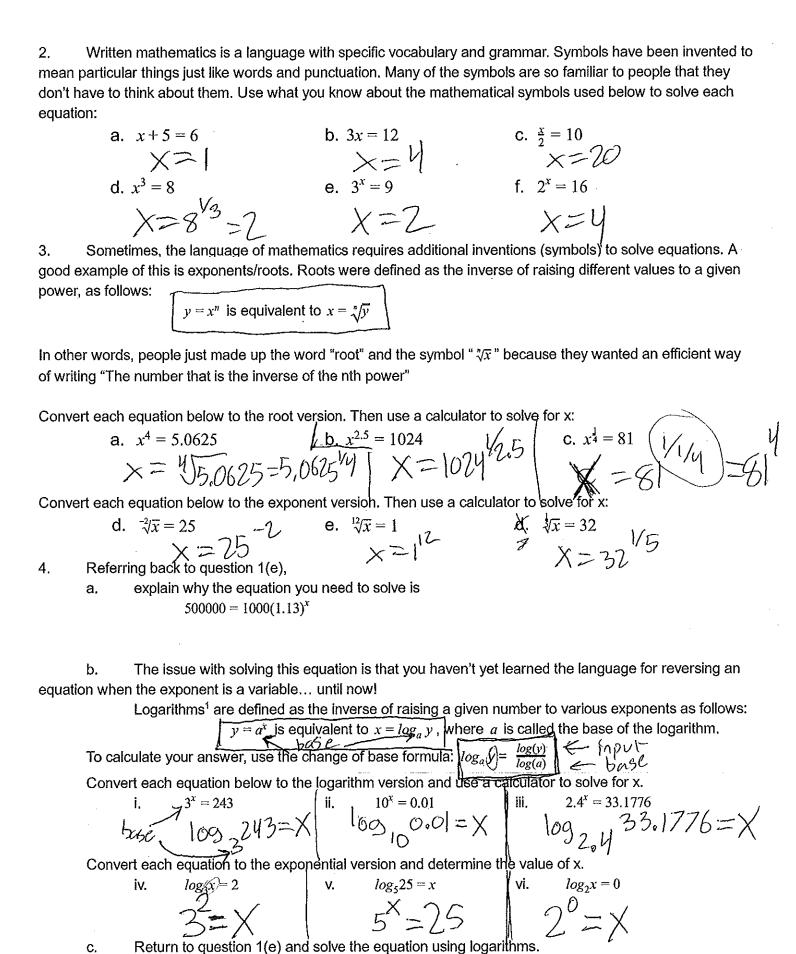
500,000 = M.(1+.13) M=43,391.15500,000 = M.11,523

d. That seems like an unreasonable amount. How about this: What interest rate would she need to earn to turn her \$1000 into enough money to afford a \$500,000 property after 20 years?

 $\frac{500000 = 1000(1+r)^{20}}{1000} = 1.364 = 1+r$ $\frac{500}{500} = \frac{1000}{1000} = \frac{364}{369} = r$

e. Hmmm...I don't think there has ever been an investment that pays that percent of return. How many years would Greta need to keep her investment of \$1000 at 13% to afford a \$500,000 property? (Why can't you solve this equation like the previous equations?)

500,000 = 1000 (1,13)X



¹ Logarithms weren't invented until 1614 and, before the use of calculators, relied on tables constructed by meticulous calculations using base 10 logarithms. Today, scientific calculators will calculate logarithms of any base.