Math-19 Homework #12

Problems

1). Consider the circle $x^2 + y^2 = r^2$ and remember that we needed to restrict the range in order to obtain the function $y = \sqrt{r^2 - x^2}$.

   a). Sketch the half-circle function and demonstrate why it is not one-to-one?

   b). Suggest a how to limit the domain so that it is a one-to-one function.

   c). Sketch the new graph for the one-to-one function and state its domain and range.

   d). By observing the graph (and the line $y = x$), predict something about the inverse function.

   e). Derive the inverse to prove your prediction.

2). You use $1000 to open a savings account at your local bank on the first of February. The savings account has an interest rate of 1.5% per year and compounds monthly on the last day of the month. You set up an auto-deposit of $100 from your paycheck to occur on the first of each month, starting with the second month (March). During April, you withdraw $250 to purchase a new gameboy (gotta catch em all!).

   a). Who is the lender and who is the borrower?

   b). Calculate $x = 1 + \dfrac{r}{n}$

   c). Construct a polynomial in x to determine the account value on July 2.

   d). What is the account value on July 2?

3). Consider the exponential function $y = -2e^{-(x+1)} - 3$

   a). List the transformations in the order that they should be applied.

   b). What is the y-intercept (if any)?

   c). What is the domain (in interval notation)?

   d). What is the range (in interval notation)?

4). Consider the logarithmic function $y = \log(-2(x + 1)) + 3$

   a). List the transformations in the order that they should be applied.

   b). What is the y-intercept (if any)?

   c). What is the domain (in interval notation)?

   d). What is the range (in interval notation)?