UNIT 3 Project

John makes DVDs of his friend's shows. He has realized that, because of his fixed costs, his average cost per DVD depends on the number of DVDs he produces. The cost of producing *x* DVDs is given by

$$C(x) = \begin{cases} 2500 + 1.5x & \text{if } x \leq 1{,}000 \\ 2500 + 1.25x & \text{if } x > 1{,}000 \end{cases}$$

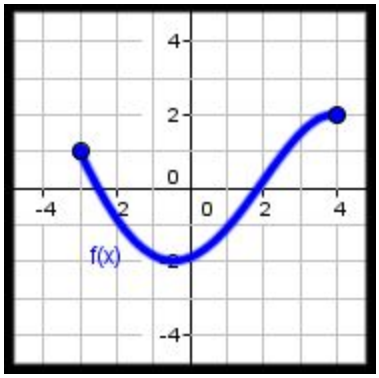
1. John wants to figure out how much to charge his friend for the DVDs without making a profit. How much should he charge for 100 DVDs in order to break even? What is the cost per DVD?
2. Suppose John makes more than 100 DVDs for his friend. complete the table below showing his costs at different levels of production. Show all of your work.

# of DVDs	**0**	**10**	**100**	**1,000**	**10,000**	**100,000**	**1,000,000**
Total Cost							
Cost per DVD							

3. Graph the function *C*(*x*) from $0 \leq x \leq 3000$.
4. What happens to the cost per DVD? Why do you think this happens?

BONUS: Write a function *D*(*x*), that can be used to find the cost per DVD for any value of *x*.

Refer to the diagram of *f*(*x*) shown below for questions 5-6



5. What is the domain and range of *f*(*x*)? Write your answer in interval notation.
6. Sketch the graph of each of the following. Describe the transformation in each graph:
   a. *g*(*x*) = *f*(*x*) - 1
   b. *h*(*x*) = -*f*(*x*)

c. $p(x) = f(x + 2)$
d. $q(x) = -f(x + 2) - 1$