Linear function applications NAME:

These problems involve variables that are linearly related, meaning their graphs will be straight lines. Draw the graphs using a straight edge.

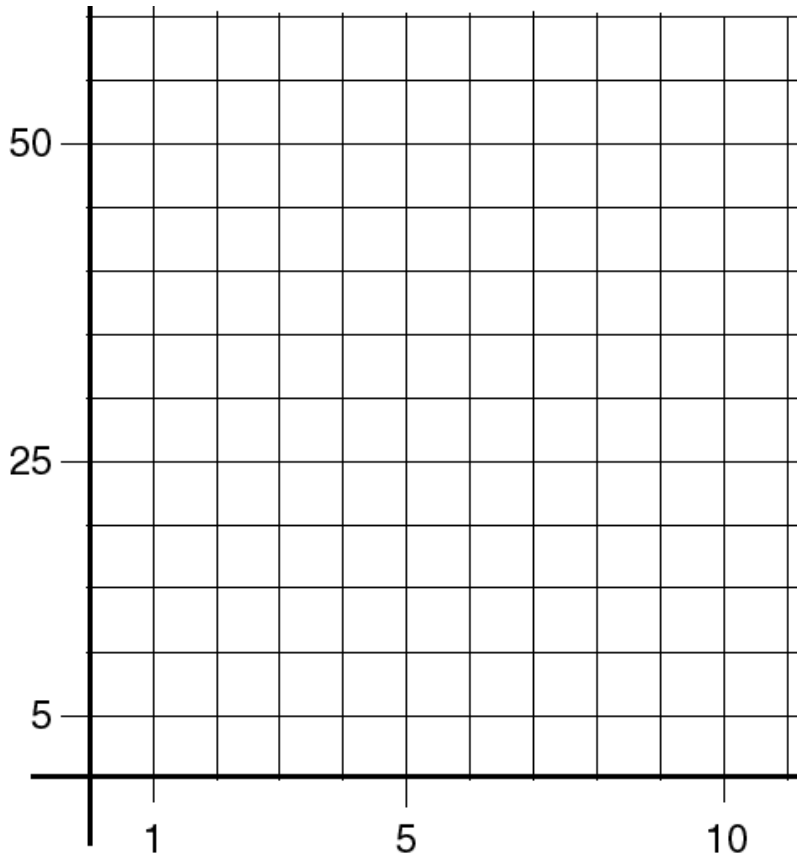
1. You produce exotic candles. You have up-front costs of $25 (perhaps the rent of your studio or one-time equipment costs) and a cost of $5 per candle (perhaps the wax and supplies needed for each candle). You sell your candles for $10 each.

Let x represent the number of candles you produce and sell. Determine algebraic equations for $C(x)$, the total cost, and $R(x)$, the total revenue. Use the tables to help you develop the patterns needed.

x	$C(x)$
0	
1	
2	
3	
x	

x	$R(x)$
0	
1	
2	
3	
x	

On the graph paper below, accurately graph $C(x)$ and $R(x)$. Use a straight edge.



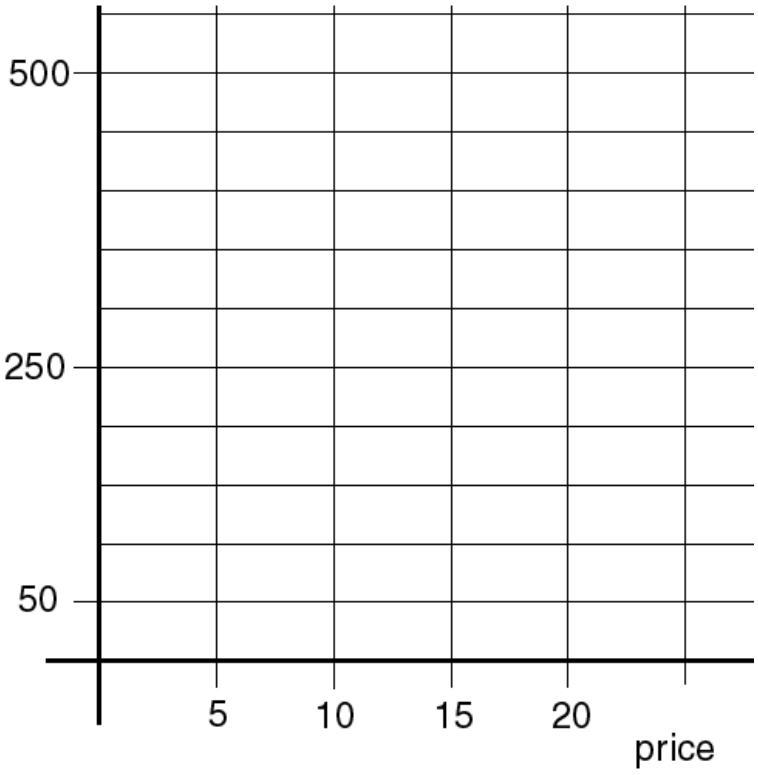
2. Use the algebraic equations for $C(x)$ and $R(x)$ to find the cost and revenue generated if you make and sell 2 candles. (Label which is which.) Where, on the graph, is this information? Do you make or lose money?

3. Use the algebraic equations for $C(x)$ and $R(x)$ to find the cost and revenue generated if you make and sell 6 candles. (Label which is which.) Where, on the graph, is this information? Do you make or lose money?

4. Algebraically, find the number of candles you would have to make and sell to break even, meaning you would not make or lose any money. Where, on the graph, is this information?

5. You are in the business of selling novelty t-shirts. You know that you can sell 150 if you sell them at a price of $15. But if you lower your price to $10, you can sell 250. Assume the relationship between price and quantity is linear. Form an equation that gives the number sold as a function of price. [Hint: Start out by writing the information given in ordered pair form (price, number sold).]

Graph this relationship. Notice price is the independent or *x* variable.



6a. Using the graph, estimate the price of each t-shirt if you sell 300 of them. Explain your method.

6b. Algebraically, find the price of each t-shirt if you sell 300 of them. Show work.

7a. Using the graph, estimate the quantity you would expect to sell if your price was $6. Explain your method.

7b. Algebraically, determine the quantity you would expect to sell if your price was $6. Show work.

The idea of questions 6 and 7 is to see the connection between algebraic and graphical means. Keep this in mind when you're solving more complicated equations.