Algebra C - Benchmark Quiz 2

By completing this Benchmark, you will provide evidence of your learning for the following learning outcomes for the class.

	Meeting Standards	Exceeding Standards
2) Analyzing Profit Graphically in a Linear System	**(2A)** I can create simple revenue functions of the form $R(x) = (price\ per\ unit)(x)$ to model the revenue of a business selling *x* units of its product. **(2B)** I understand that <u>profit</u> made by selling x units is calculated by taking the difference: $R(x) - C(x)$ (If revenue is greater than cost, profit is a positive number. If revenue is less than cost, than profit is negative) **(2C)** I can graph revenue and cost functions on the same graph for the purpose of analyses. (I can visualize profit as the distance (pos or neg!) between revenue and cost functions. I can interpret the intersection point where R(x)=C(x) as the "break-even" point) **(2D)** Given a graph comparing cost and revenue functions, I can plot new points $(a\ ,\ R(a) - C(a))$ to represent a profit function.	___ I can create a *new* linear profit function by taking the difference of revenue and cost functions: (i.e. I can use the distributive property and combine variable terms) $P(x) = R(x) - C(x)$ ___ Given multiple production options and their related cost functions, I can decide which is "best" from the perspective of a business owner (Which cost function will have the fastest break even point? Which cost function maximizes long-term profit?)
6) Principles of Business	**(5A)** I understand ONE path that a product takes to reach a consumer: independent manufacturer → independent retailer → consumer. I can chart the flow of money along this path. (retail price = cost a consumer pays to retailer, production cost = cost a business pays to manufacturer), whole-sale price (cost an independent retailer pays to business). **(5B)** I understand the mathematical relationship between business cost, revenue and profit. **(5C)** I understand different sources of fixed and variable costs for a business. I can identify and sort them. **(5D)** I understand that the break-even point of a business separates negative profit (losses) from positive profit (gains).	___ I investigate other consumer product channels that exist and sources of cost and revenue that exist within them Direct: Business Owned Manufacturer --> Consumer (e.g. business that owns its manufacturing process, sells by mail-order , direct online sales) In-House Retailer: Ind. Manufacturer → Business Owned Retailer → Consumer (e.g. business with branches of retail stores or online marketplaces that outsources manufacturing).

Page 1: Evaluating Cost and Revenue Functions and Calculating Profit

Donte starts a business that sells custom emoji phone cases to customers online.

He plans to use another company to make the cases and to sell them on his own website.

He purchases facebook ads to target customers in New York.

Revenue

Donte plans to charge customers $20 for each phone case

$$R(x) = 20x$$

the REVENUE for selling x phone cases is equal to 20 times x

Costs

Each phone case costs Donte $5 to make. In addition, starting his business will cost him $900.

$$C(x) = 5x + 900$$

the COST for producing x phone cases is equal to 5 times x plus 900.

1) Complete the table below by using the revenue and cost functions above.

(x) number of phone cases	Revenue	Costs	Profit = Revenue - Cost
10			
30			
75			

2) Complete the sentences below:

a. *If Donte sells* _____ *cases in he will have* _____ *profit.*
positive or negative

This means that...

b. *If Donte sells* _____ *cases in he will have* _____ *profit.*
positive or negative

This means that...

Page 2: Creating Revenue and Cost Functions

Because his phone cases were successful, Donte decides to also start selling custom earbuds.

He needs to use two different companies to make them: a sound design company to make the earbuds, and another company for the headphone cables.

3.) Create functions to represent the revenue and cost of Donte's new product.

-Donte pays an illustrator $200 to design his business logo.

-He also pays YouTube $310 for advertising.

-The cable for each pair of earbuds costs $0.75

-The earbud tips & speaker cost $1.50 for each pair.

Cost Function

$$C(x) = \underbrace{\square}_{\text{total variable cost}} x + \underbrace{\square}_{\text{total fixed costs}}$$

Donte plans to sell each pair of earbuds at a price of $15

Revenue Function

$$R(x) = \underbrace{\square}_{\text{consumer price}} x$$

4) Suppose Donte sells 40 earbuds. Use the functions you created above to calculate his costs and revenue. *(Show all calculations!)*

Total Revenue	*Total Cost*

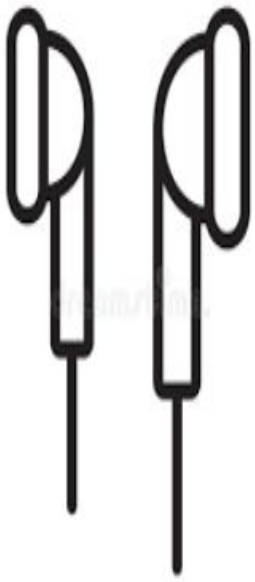
5) Based on your work above, how is his earbud business doing so far?

(Choose at least two pieces of vocab from the bank below to use in your response)

Profit	Positive	Negative	Zero
greater than	less than	equal to	

Page 3: Analyzing a Graph of Cost and Revenue

Use the link below to see a graph that represents Donte's Earbud business.



Use this graph to answer questions **6)** and **7)** on the first slide.

Use this link.

Page 4: Notice and Wonder

Your final task is to look to the future.

Take a couple minutes to play with the graph on the 2nd slide.

Then, use that graph to answer questions **8)** and **9)** on the 3rd slide.

Use this link.

Start on Slide 2 (questions on slide 3)