

M102 Performance Task

Breaking Even with Side Hustle Businesses

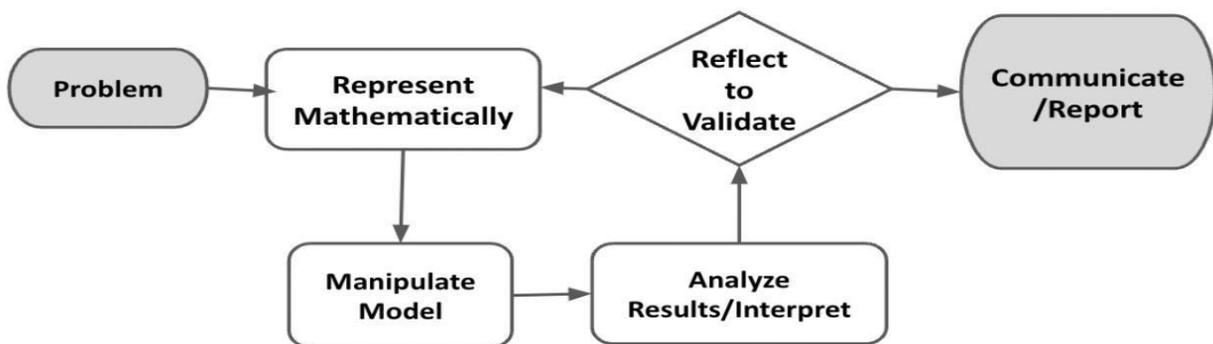
The Modeling Cycle

You are looking to make some extra cash, and you decide to invest in a side hustle business. Side hustle businesses are a wonderful way to make money outside of school hours. Explore the two side hustle options below and choose one that is a best fit for you. Once you choose an option, you will need to complete the following:

- Create **two** different equations to model the **cost** and **profit** of your side hustle.
- Graph these equations to determine the “break-even point.”
 - The “break-even” point is where the total expenses (cost) and total revenue (profit) are equal.
- Present your findings to the class. (Remember this is a business and you must put your best foot forward.)

Mathematical models are used to make sense of ideas and phenomena in our world. As illustrated in the image below, the modeling cycle is a process of collecting data about an idea or problem, creating models of that data, analyzing the story told by those models, and reporting the results to the appropriate audience. In this task, you will be engaging with the mathematical modeling cycle to analyze the difference between an individual and a group knowing the correct answer to a particular question.

Your process and final products from this task will be shared with the greater class as a pitch for the side hustle. There will be time for them to probe and ask clarifying questions. Be prepared to answer them, including what you have not yet resolved. Their job is to decide whether your business is a wise investment.



Source: *Diagram of Modeling Process*. From “Progressions for the Common Core State Standards for Mathematics”

Breaking Even with Side Hustle Businesses

Launch

There are several ways that students can make money outside of school hours. Important factors to consider when thinking about a business are the expenses involved as well as how much revenue could be earned. Not all side hustles, or business ventures, are the same.

QUESTION 1



What are some ways that students can make money?

[This question is not meant to be scored. Look for reasonable responses (see teacher-facing guide for ideas). Expect students to answer individually on their own forms, as well as participate in a class discussion.]

The following students' responses are typical of what a teacher might expect.

Student A

- Babysitting
- Selling food
- Selling old clothes
- Tutoring

Student B

Lemonade Stand, mowing the lawn, getting a job.

Student C

Students can make money through summer Jobs or regular Jobs along with chores and babysitting.

Problem, Formulate, and Represent Mathematically

In the **Problem**, **Formulate**, and **Represent Mathematically** sections, you will determine weekly cost factors, availability, and weekly revenue for your side hustle. This will allow you to formulate your weekly profit, which will be the difference between your costs and revenue. The **Problem, Formulate, and Represent Mathematically Checklist** can be used to ensure you have the necessary components before moving on to the remaining parts of the task.

ACTION 1



You were just gifted \$500 to kick start your side hustle (except in Option A). Consider this “seed money.” **Seed money** is money given to a business in its initial stages which you do not have to pay back. You must consider this a cost of the side hustle regardless of which one you choose. Each side hustle also has factors and constraints that will impact your business. These are things that you need to keep in mind as you start earning, so you can break even and then start making a profit.

Choose one of the two side hustle businesses listed in the pages below. Each side hustle has specific considerations to think about as you start your business.

Use the slope-intercept equation to help create your equations, $y = mx + b$, where:

y = total cost

m = slope, (e.g., hourly rate)

x = the variable (e.g., time, items, lawns)

b = the y -intercept

Option B - Landscape Designer

\$500 in seed money available.

You provide landscaping services in the form of mowing lawns for 10 families. You must schedule your services during after-school hours or weekends.

[Expect students to complete all 3 questions. They may show their work in a combination of ways. See the sample student responses which follow each option.]

Use the following resources to research your side hustle and plan accordingly!

[Home Depot](#)

[Lowe's](#)

[Amazon](#)

1. Determine weekly expenses and start-up cost:
 - Lawnmower
 - Gas and oil container
 - Engine oil
 - Gas
 - Weekly maintenance budget (in case something ever goes wrong you have money set aside)
2. Determine weekly income:
 - Hourly rate
3. Plan out your work week in the calendar template below using your availability.

Considerations:

- The weather
- You can only spend \$500 to start your business.
- The average human can mow 1 average-sized lawn per hour.
- How often families need their lawns to be mowed.
- You cannot mow lawns during school hours.

Student A

1. Determine weekly expenses and start-up cost:
 - Lawnmower **Yard Force Self Propelled Lawn Mower Briggs & Stratton 150cc Gas Engine 22-inch Steel Deck 3-in-1 Mulch, Bag, Side Discharge, 12-inch High Rear Wheels \$380 from Amazon**
 - Gas and oil container **Briggs and Stratton Press 'N Pour Gas Can 5 gal \$25 from Amazon**
 - Engine oil **Briggs and Stratton SAE 5W-30 \$9 from Amazon**
 - Gas **\$6 per hour based on Google search**
 - Weekly maintenance budget (in case something ever goes wrong you have money set aside) **I don't know. Maybe \$30**
2. Determine weekly income:
 - Hourly rate **\$35**
3. Plan out your work week in the calendar template below using your availability.

This student did a thorough job of researching costs and has attended to all elements, including searching Google to find out about how much gasoline would be used for every hour of mowing. This is a good model for other students to follow. It may be helpful for teachers to encourage students to share their strategies for determining weekly expenses for this option at the onset of the activity.

Student B

Start 500\$

[Amazon](#)

1. Determine weekly expenses and start-up cost:
 - Lawnmower
BLACK+DECKER Electric Lawn Mower with Bike Handle, 15-Inch, 10-Amp, Corded (BEMW472BH)
\$139.49
\$149.25 with tax
 - Weekly maintenance budget (in case something ever goes wrong you have money set aside)
\$350.75
2. Determine weekly income:
 - Hourly rate
\$25
3. Plan out your work week in the calendar template below using your availability.

This student came up with a reasonable cost for an electric mower, so gas and doesn't need to be planned for in the expenses. And a hourly rate of \$25 is typical for this type of work. However, it appears that \$350.75 is shown as a maintenance budget. This is likely the anticipated weekly income. When conferencing with the student, the teacher should ask about this expense and suggest the student update it if necessary.

Student C

1. Determine weekly expenses and start-up cost:
 - Lawnmower \$219
 - Battery \$130
 - Weekly maintenance budget \$50
2. Determine weekly income:
 - Hourly rate \$25
3. Plan out your work week in the calendar template below using your availability. Tuesday, wednesday, friday

This student chose to purchase an electric mower (\$219) and did attend to other expenses such as a battery (\$130) and weekly maintenance cost (\$50). While the student lists an hourly rate of \$25 here, he later changed it to \$40 per hour but never updated this section. The teacher should encourage the student to re-evaluate and revise the task as changes are made while working through the task.

QUESTION 2



What do you need to consider when scheduling your hours? Complete the calendar to plan your week.

[Students should fill out this calendar to show their availability. Understand that students may include all aspects of their weekly schedule, not just their work availability for their side hustle. The totals shown were computed by the teacher to check for consistency throughout the task.]

Calendar

	Student A	Student B	Student C
Sunday	Sunday 1-5 pm 4 hrs	Rest day	0
Monday	Monday 4-7 pm 3 hrs	3:30 - 5:00 (1.30)	0
Tuesday	Tuesday 4-7 pm 3 hrs	3:30 - 5.30 (2)	4pm-9pm
Wednesday	Wednesday No work - church	3:30 - 5.30(2)	4pm-9pm
Thursday	Thursday 4-7 pm 3 hrs	Rest	0
Friday	Friday No work	3:30 - 5.30(2)	4pm-9pm
Saturday	Saturday 10-4 pm 5 hrs (1 hr- lunch break)	10:00 - 12:00 lunch 1:00 - 5:45 (7)	0
	18 hours total	13 1/4 hours total (slightly off from hours shown)	15 hours total*

*While working until 9 pm might be reasonable during summer hours, it's worth asking the student about working until 9 pm during the months where it gets dark much earlier.

QUESTION 3



What are your weekly costs, revenue, and profit? Summarize in the table below.

[The number of hours students determined they could work in Question #2 should be factored into their Weekly Revenue below.]

	Weekly Expenses	Weekly Revenue	Weekly Profit
Student A			
	Weekly Expenses	Weekly Revenue	Weekly Profit
	Oil \$9 Gas \$108 (\$6 for 18 hrs) Maintenance \$30 \$147	\$35 for 18 hrs \$630	\$483

The expenses are consistent with the student's weekly costs listed in the start-up section. The revenue shown is a product of 18 hours at \$35 per hour, which is consistent with the student's scheduled hours. The weekly profit is correct for revenue-expenses. At this point, the start-up costs for purchasing the mower and gas can do not need to be accounted for. This is meant to deal just with ongoing weekly expenses and profit.

	Weekly Expenses	Weekly Revenue	Weekly Profit
Student B			
	- Driving to customers gas 118\$	- 25 x 14.2 = 355\$	- 355 - 118 = 237\$

The hourly rate of \$25 per hour is consistent with what the student indicated in the start-up section, but the hours are slightly off (14.2) from the student's scheduled hours. The times add up to 13 ¼ hours if we read 1.30 as 1 ½ hours for Monday. The math is correct given revenue (355) minus expenses (118) to equal profit (237), but the weekly expenses still don't match what was reported in the start-up section. This disconnect should be raised with the student during the first consultation.

	Weekly Expenses	Weekly Revenue	Weekly Profit
Student C			
	\$30 charging mower at the house	\$600 mowing lawns electric	\$540

The \$30 expense for charging the mower each week seems reasonable, however it doesn't match the initial weekly expense of \$50 shown in section 1. It's worth asking the student how this value was determined. Here is the first time that \$40 per hour was used to determine a revenue of \$600 (15 hours x \$40), but again, it's worth asking the student about the disconnect between what was reported in the first section and this question. How the profit was determined to be \$540, given 600-30 is 570, also needs to be reconciled by the student.

Problem, Formulate, and Represent Mathematically Checklist

Requirement	Fulfilled?
Determine availability, expenses (consider all factors), and weekly revenue.	<input type="checkbox"/>
Determine weekly profit.	<input type="checkbox"/>
Teacher Consultation:	_____

Manipulate Model

In the **Manipulate Model** section, you will create different representations to help you analyze your profit. The **Manipulate Model Checklist** can be used to ensure you have the necessary components before moving on to the remaining parts of the task.

QUESTION 4



How can you represent your weekly expenses, revenue, and profit? Write three different equations to model your data using $y = mx + b$. Then, interpret each variable (m , x , and b) for each equation, including units.

Variable	Equation #1	Equation #2	Equation #3
	Expenses $y =$ _____	Revenue $y =$ _____	Profit $y =$ _____
y	Total expenses in dollars	Total revenue in dollars	Total profit in dollars
m			
x			
b			

Student A

Equation 1: The student correctly carried over the total expense from Question 3 here (\$147). Using --- for m and x here makes sense because this is only dealing with set expenses.

Equation 2: The revenue equation and description of each variable is clear and consistent. Again, using --- for b here makes sense.

Equation 3: The descriptions of the variables for the profit equation are clear and correct.

Variable	Expenses $y = \underline{\$147}$	Revenue $y = \underline{\$35x}$	Profit $y = \underline{\$35x - 147}$
y	Total expenses in dollars	Total revenue in dollars	Total profit in dollars
m	---	\$35 per hour	\$35 per hour
x	---	x hours mowing	x hours mowing
b	\$147	---	\$147 weekly expenses

Student B

Equation 1: The student uses the cost of the lawn mower from section 1 as her only expense. While this might be reasonable for an electric mower, it doesn't match up with the expense total listed in Question 3.

Equation 2: The revenue equation does not make sense. The value for m (25) and x (number of hours) is correct, but the 14 for b needs clarification.

Equation 3: It appears the student eventually understood how to put together a profit equation using 25 for m, 14.2 for x, and (149.25-14) for b. However, this equation still doesn't adequately connect to earlier responses and the teacher should help the student uncover her errors and make revisions before completing this task.

Variable	Expenses $y = \underline{\text{[redacted]}}$	Revenue $y = 14.2x + 14$	Profit $y = 25x - 135.25$
y	Total expenses in dollars	Total revenue in dollars	Total profit in dollars
m	0	25	25
x	none	14.2	14.2
b	149.25	14	135.25

Student C

Equation 1: The student uses the cost of the lawn mower and battery as the total expense (\$219+\$130) but this isn't consistent with other parts of the task. Indicating 0 for m and none for x is correct.

Equation 2: The revenue equation is partially correct for mx, but there is no support for how \$150 was determined for this equation. The student needs to justify where 150 came from or revise the equation. The student also needs to include descriptions (interpretations) for m, x, and b.

Equation 3: Again, the profit equation is partially correct, but it is not clear where 375 came from. The teacher should direct the student to make corrections to this table before moving forward.

Variable	Expenses $y = 349$	Revenue $y = 40x + 150$	Profit $y = 40x - 525$
y	Total expenses in dollars	Total revenue in dollars	Total profit in dollars
m	0	\$40	Income per hour
x	none	15	Total hours worked (15)
b	\$349	\$150	$375 + 150 = 525$

QUESTION 5

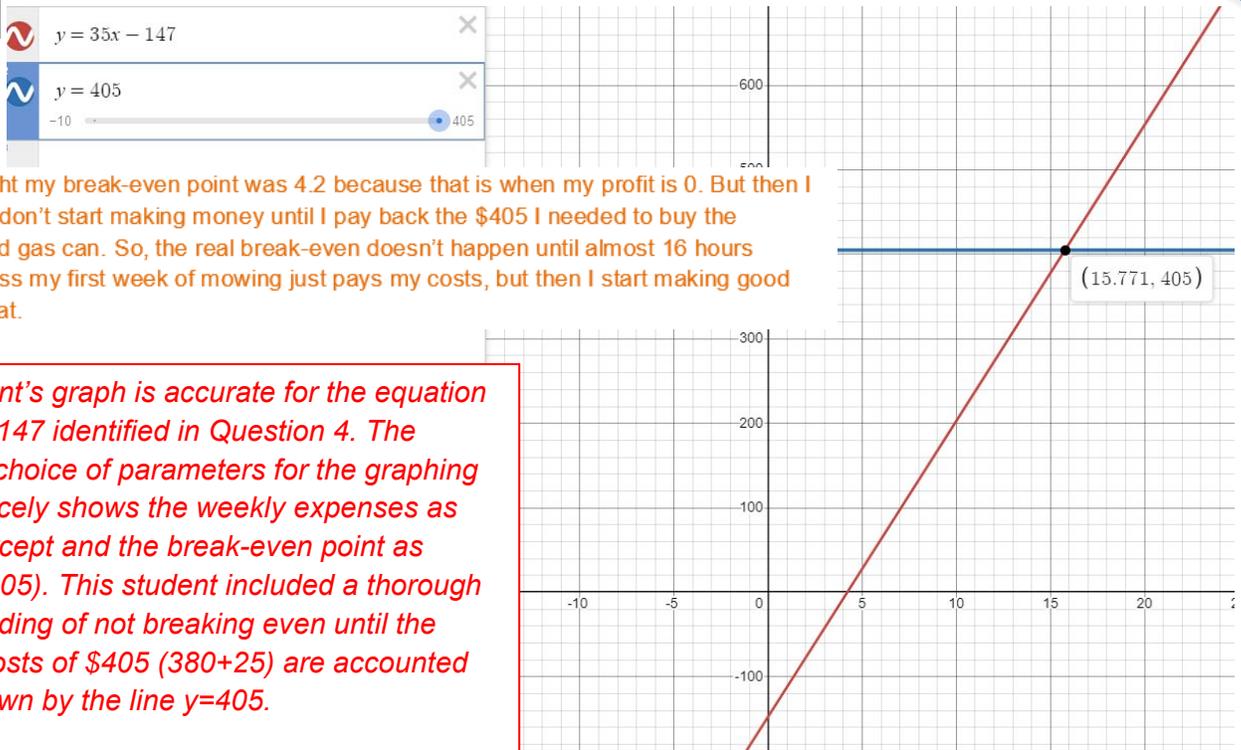


Graph your generated line for profit in **Desmos**. Use your graph to determine the point where you will break even (*i.e.*, how many hours you should drive or how many lawns should you mow?). Include your graph to support your response.

What is your identified break-even point? Explain your reasoning.

[Students do not have to use Desmos to create the graph, but it is helpful in terms of manipulating the variables. Since Option C did include the use of \$500 in seed money, expect the break-even point to be where $y=500$ or less (depending on the total start-up costs). However, given the statement “Seed money is money given to a business in its initial stages which you do not have to pay back” a student may not include this as an expense that needs to be surpassed before a true profit is made. The seed money expense will likely need to be explored further with students after they grapple with their equations.]

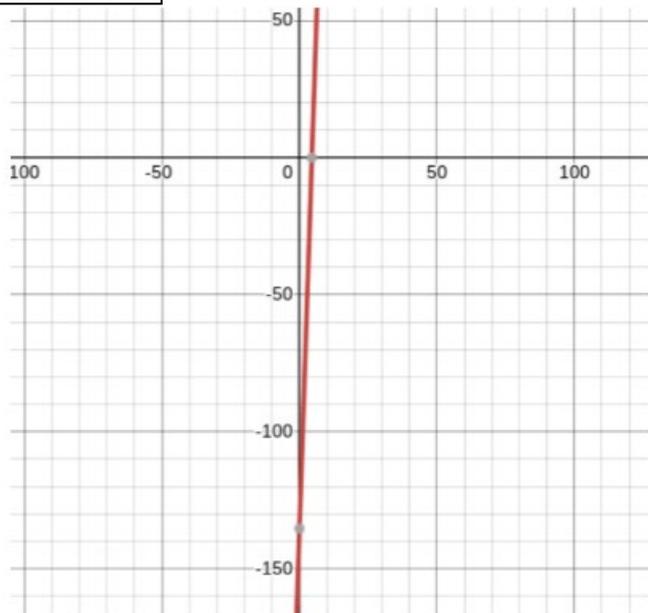
Student A



At first, I thought my break-even point was 4.2 because that is when my profit is 0. But then I remembered I don't start making money until I pay back the \$405 I needed to buy the lawnmower and gas can. So, the real break-even doesn't happen until almost 16 hours (15.771). I guess my first week of mowing just pays my costs, but then I start making good money after that.

The student's graph is accurate for the equation $y = 35x - 147$ identified in Question 4. The student's choice of parameters for the graphing window nicely shows the weekly expenses as the y-intercept and the break-even point as $(15.771, 405)$. This student included a thorough understanding of not breaking even until the start-up costs of \$405 ($380+25$) are accounted for as shown by the line $y=405$.

Student B



What is your identified break-even point?

(5.41,0)

The student's graph is accurate for the equation $y = 25x - 135.25$ identified in Question 4. The student's choice of parameters for the graphing window shows the weekly expenses as the y-intercept and the break-even point as (5.41, 0). Altering the x scale to include a reasonable number of hours would help make sense of a weekly profit. The seed money that was needed to purchase the lawn mower was never adequately accounted for and should have been used to determine the actual break-even point. Other errors previously noted should be corrected and this graph should be updated.

Student C

What is your identified break-even point?

I showed me I should mow 13 lawns to break even. One lawn per hour 40 dollars a lawn. I will be doing 15 lawns per week 1 lawn per hour 5 hours a day 3 out of the 7 days of the week 13 laws till I get my money back. Then those 2 lawns I earn money.

The student didn't include their graph with this question, but their explanation seems to support the use of the profit equation shown in Question 4 ($y = 40x - 525$). A graph of this equation shows an x-intercept of 13.125 which could account for the student stating that he needs to mow 13 lawns to break even. This student would benefit from a consultation to include how to separate the start-up costs into a separate expense from normal weekly expenses (as the b value). The student needs to go back to the beginning of the task and make the corrections to both make the variables and costs consistent throughout, as well as show the initial equipment costs as another equation where $y =$ initial start-up cost. Graphing this second line will intersect with a corrected weekly profit line to show the actual break-even point.

Manipulate Model Checklist

Requirement	Fulfilled?
Write equations accurately representing revenue and expenses using the $y = mx + b$ format.	<input type="checkbox"/>
Each equation's variables are accurately interpreted, using correct units.	<input type="checkbox"/>
The Desmos profit line is accurately graphed and used to determine and identify a break-even point.	<input type="checkbox"/>
The model is interpreted to identify costs, how income is generated, and how profit might be maximized weekly.	<input type="checkbox"/>

*This last requirement doesn't need to specifically address **maximizing** weekly profit for Option B. This requirement is meant to prompt a conversation between the teacher and student to make sure their model connects costs, revenue, and profit.*

Reflect and Report

In the **Reflect and Report** sections, you will reflect on and provide valuable feedback about the task you chose and completed. You will also use what you learned about that particular side hustle business to create a persuasive presentation in which you try to convince your classmates that your side hustle is a profitable investment! The **Reflect and Report Checklist** can be used to ensure you have completed all the necessary components of this final part of the task.

Reflect

QUESTION 6



Which side hustle did you undertake? What surprised you as you completed this task?

[This question is to prompt students to reflect on what they uncovered during their research. Teachers should look for meaningful responses, but they are not meant to be “scored.”]

Student A

I decided to start a landscape company, but I really only mow lawns. I was surprised that I had to plan for maintenance, so that will help me if I really decide to do this as a job next year. I honestly thought the mowers would cost more, but I found a good deal on Amazon.

Sufficient response.

Student B

The side hustle that i took is a landscaper, i was surprised that the amount of money that you get as one. The hours 14.2×25 get you a good amount of money after some time but first you have to get out of your dept. But I only have to mow about 6 lawns before i get out of it then thats when i start to make the money.

The student misunderstood the break-even point to mean number of lawns needed to mow (rather than number of hours) in order to pay for the expenses claimed in the profit equation. This might be acceptable if the student assumed it takes 1 hour to mow 1 lawn. However, the start-up cost is never addressed directly. The teacher should ask about that when consulting with the student.

Student C

I chose lawn care. What surprised me about this task was the number of lawns I would have to mow before making a profit. I was also surprised by the price of a quality electric mower.

Sufficient response.

QUESTION 7



What was the most challenging part of this task? *[Again, this question is to prompt students to reflect on the task and indicate where more work with any math concepts might be needed.]*

Student A

Understanding how to graph a line to show my break-even point was the hardest part. I didn't think about the money I had to borrow to start my business until after I graphed a line just showing my profit. I had to change the settings on Desmos a few times to even see the part of the graph where I broke even.

Nice reflection. Reminding students how to use the Desmos graphing tool to change the display window is probably worth discussing before students get to this question.

Student B

The most challenging part of this task is finding out what tools you are going to use. You need to find the one that doesn't cost that much but is also the most money making one. I got an electric one because you don't need gas for it only need to charge it so i didn't need to spend money on gas.

Sufficient response.

Student C

Finding a system where I could make a profit. I had to change my mind on things several times before I could make a profit.

Stating he had to "change my mind" on things several times might help explain the number of inconsistencies throughout the task for this student.

QUESTION 8



What was the most fun part of this task? *[Again, this question is to prompt students to reflect on the task.]*

Student A

I had fun researching lawn mowers and finding one that I would want to use for my business. I think I might really like to do this as a business next year once I get my driver's license.

Sufficient response.

Student B

The most fun part of this task is figuring out what lawn mower you want because it was the one you got to do on your own. There were so many different choices to choose from and it was the most challenging.

Sufficient response.

Student C

The most fun part of this task was researching resources to use for my side hustle. I enjoyed this because it allowed me to apply real-world scenarios into a school assignment. This made the project feel less like a chore.

Sufficient response.

Report**ACTION 2**

Convince your classmates to invest or not invest in your side hustle (Shark Tank style). Use your findings—your data on cost and income. Be sure to be persuasive, as there is investment money at stake!

Considerations:

- How does your break-even point differ from those who chose the other side hustle option?
- After looking at your data, will you stick with your chosen side hustle business, or choose another?

Student A

Lawn Jockey
Best lawn mowing service in the area!



\$40 per lawn (up 1/4 acre)
Call for estimates for larger lawns
(850) MOW-LAWN
(850) 669-5296

Fast and reliable service
Satisfaction guaranteed
Weekdays or Weekends available

Lawn Jockey
Invest in my business!

Looking for an investment of just \$500 to start my business. In return, I'll mow your yard every 2 weeks for 1 year! At no charge to you. What a deal!

My prices are based on an hourly rate of \$35 per hour and weekly expenses of \$147 for gas and maintenance.

Invest in Lawn Jockey!

While the student's presentation didn't focus on the break-even point, it did include the hourly rate and expenses from the profit equation. The fact that the student was looking for an investor to cover the start-up costs, in exchange for free lawn mowing service for a year, shows an entrepreneurial spirit and understanding of the task.

Student B

Nature's horizon Landscaping

My name is Mary Reiff, and i am the owner on Nature's horizon Landscaping. We are a lawn care service that specializes in making your lawn look beautiful. We have our services at affordable rate for everyone that wants it. We are looking for an investor to help us grow and expand out business so we can get new equipment and make our customers lawns look great. We get a weekly profit of 135.25\$ and our looking to make more to help out other with there lawn care that aren't able to take care of it they way they want to.



This represents a good attempt at giving someone a reason to invest in her company. However, she didn't lay out what kind of investment she needed in terms of specific costs (mowers, equipment, etc.). She did include what she thinks is her weekly profit but lacks sufficient detail to support how her profit is determined. The student should be encouraged to connect all aspects of this task, fixing the incorrect elements and explaining the weekly maintenance cost indicated in the first section.

Student C

JP's Lawn and Care

You should invest in my business because I always have people that want me to work for them, I could always increase the price of my work because I have family and loyal customers that would pay more than any other business just to have me work for them.

My weekly profit currently is \$540 which is above average in the lawn care business.

While the student's presentation didn't focus on the break-even point, it did include the hourly rate and expenses from the profit equation. The fact that the student was looking for an investor to cover the start-up costs, in exchange for free lawn mowing service for a year, shows an entrepreneurial spirit and understanding of the task.

Reflect and Report Checklist

Requirement	Fulfilled?
Provide specific, detailed feedback on the side hustle business that was researched during this task.	<input type="checkbox"/>
Presentation includes accurate, pivotal factors from the related data collection and analysis that include weekly profit calculations based on expenses and revenue and the break-even point for the business.	<input type="checkbox"/>
Presentation is persuasive, articulate, and demonstrates entrepreneurial creativity alongside mathematical precision and a business mindset.	<input type="checkbox"/>
Presentation is convincing to the audience with compelling evidence for investing or not investing in that side hustle business.	<input type="checkbox"/>
Teacher Consultation:	_____

Extension *[Not required]*

Keep thinking about your side hustle business—the best entrepreneurs are always seeking ways to improve...or to move on to new things! Challenge yourself and awaken your entrepreneurial genius by responding to the following reflective questions.

1. Did you make the wrong choice? Is there another side hustle business that you think will be better? Prove it!
2. Consider unexpected additional factors and how they would impact on your profit and other additional decision making.

1. Did you make the wrong choice? Is there another side hustle business that you think will be better? Prove it!

I made the right choice. I can either pay back my start up costs after 1 week of mowing lawns or keep the money if someone will invest in my business (like my grandparents). I already mow their yard sometimes anyway.

2. Consider unexpected additional factors and how they would impact on your profit and other additional decision making. *As long as I start with a new lawnmower, I should be okay for a couple years. I did plan for maintenance so I can get the mower tuned up if needed.*

Thoughtful response. Pitching to grandparents for an investment rings true.