

# Moving Up Moving Out

## Tasks

You have decided that it is time to move into a place of your own! To make a successful move, you will have to get a job to pay for your apartment, utilities, and other related expenses. In order to work through the finances, you will need to compare the cost of apartments to find the place that works best for you. Finally, you must find a savings plan that works best for you in case of unforeseen expenses.

Below is the list of tasks that you must complete in this project. A task is a set of activities that you will work on under the direction of your tutor.

## Task 1: Finding Your First Apartment!

You have decided it's time to move out and search for an apartment. When deciding on an apartment, you need to remember to take into account the security deposit as well as the monthly rent. You have narrowed it down to the following two apartments. Which one do you think is the best option?

### Activity 1: What are the variables?

You are considering two apartments; one on Mango Street and one on Peach Street. The table below represents the costs of these apartments. Use the information given to complete the following activities:

| Apartment              | Monthly Rent | Security Deposit |
|------------------------|--------------|------------------|
| Mango Street Apartment | \$900        | \$2,300          |
| Peach Street Apartment | \$1,000      | \$500            |

1. When deciding on an apartment, there are two variables to consider. If one variable represents time (in months), the other variable represents:

2. In identifying the variables, let  $x$  = time (in months), then  $y$  =

## Activity 2: What's it going to cost?

You decide to create a table to compare the cost of each apartment (including security deposit) for 6, 12, 18, and 24 months. Complete the table below:

| Apartment    | 6 months | 12 months | 18 months | 24 months |
|--------------|----------|-----------|-----------|-----------|
| Mango Street |          |           |           |           |
| Peach Street |          |           |           |           |

### Activity 3: Identify the system!

In order to better understand the cost of each apartment, you are going to write an equation in slope intercept form that represents the total cost of each in terms of x and y.

| Apartment              | Monthly Rent | Security Deposit |
|------------------------|--------------|------------------|
| Mango Street Apartment | \$900        | \$2,300          |
| Peach Street Apartment | \$1,000      | \$500            |

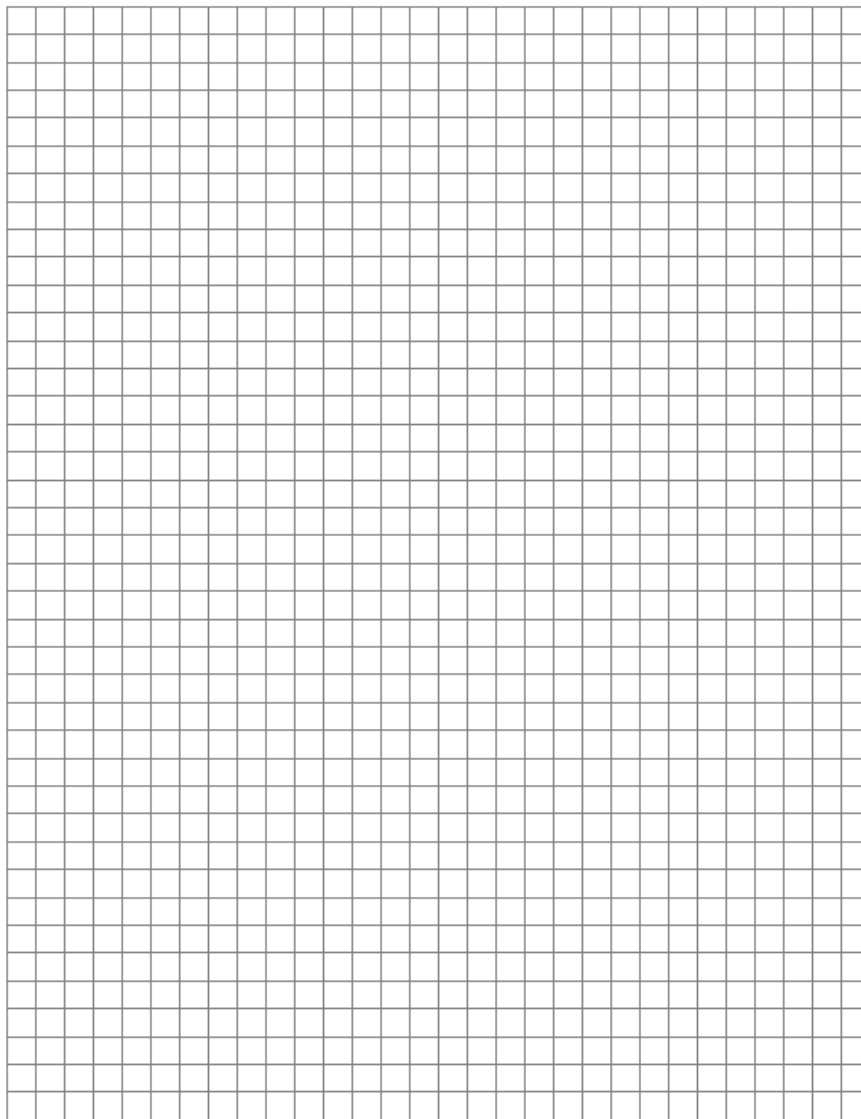
Mango Street:

Peach Street:

#### Activity 4: How do they compare?

You are having difficulty determining which apartment is most economical. You decide to determine the point of intersection graphically.

- a. Graph the system of equations from Activity 3 on a coordinate plane and label each line. You may use a [web-based graphing tools](#), a different tool of your choice, paper and pencil, or the graph paper provided below. Share your graph with your Tutor.



- b. What is the point of intersection? Write as an ordered pair.

- c. You are not sure if you found the point of intersection correctly, you decide to verify that your above answer is correct by solving a system of equations from Activity 3 using the elimination or substitution method. Show your work in the space provided.

- d. What does the point of intersection represent when considering the cost of each apartment? Explain your answer in the space provided.

### Activity 5: Which place will you choose?

After comparing apartments, your friend texts you with information about an apartment on Blueberry Street, the cost is represented by the equation:

$$y = 800x + 1500$$

- a. What is the total cost of each apartment at the end of three months? Place your answer in the space provided.

Blueberry Street:  $y =$  \_\_\_\_\_

Mango Street:  $y =$  \_\_\_\_\_

Peach Street:  $y =$  \_\_\_\_\_

- b. When (in months) will the cost of Blueberry and Peach Street apartments be the same? Show or explain your work in the space provided.

- c. Which apartment do you want to rent? Justify your answer with mathematical reasoning in the space provided. Show or explain your work in the space provided.

## Task 2: How much money do you need?

After deciding on an apartment you discover that you have to pay for basic utilities and some additional bills. In order to make an informed decision, you will need to compare your income to your expenses and determine how much you will need.

### Activity 1: Keep it linear!

You have done a little research and realized that the average monthly rent for an apartment in your area is \$1,000 while the average monthly fee for fixed utilities is \$225 (this includes water, heat, electric, and sewer). At your current job you make \$8.25 an hour.

- a. You don't know if you will make enough money to cover the cost of rent and utilities. In order to determine if you will earn enough money, write an inequality to show how many hours ( $x$ ) you have to work per month to pay the rent and utilities in the space below:

- b. What is the minimum number of hours you have to work per month to pay these bills?  
Show your work and justify your answer mathematically below.

### Activity 2: Create a system!

After you cover the basic utilities, you realize that you need more money to pay items such as a cell phone and a cable television. The average cost per month for a cell phone plan and cable and internet service is \$250. Now you need a total of \$1,475 per month.

- a. You need to get a second part-time job. You find one that pays \$9.00/hour; however, you are continuing your education and can only work a maximum of 40 total hours per week (172 hours per month).

$x$  = the number of hours worked at \$8.25/hour job

$y$  = the number of hours worked at \$9.00/hour job

Note: there are 4.3 weeks per month

Using the information above, write an inequality for total hours worked in a month.

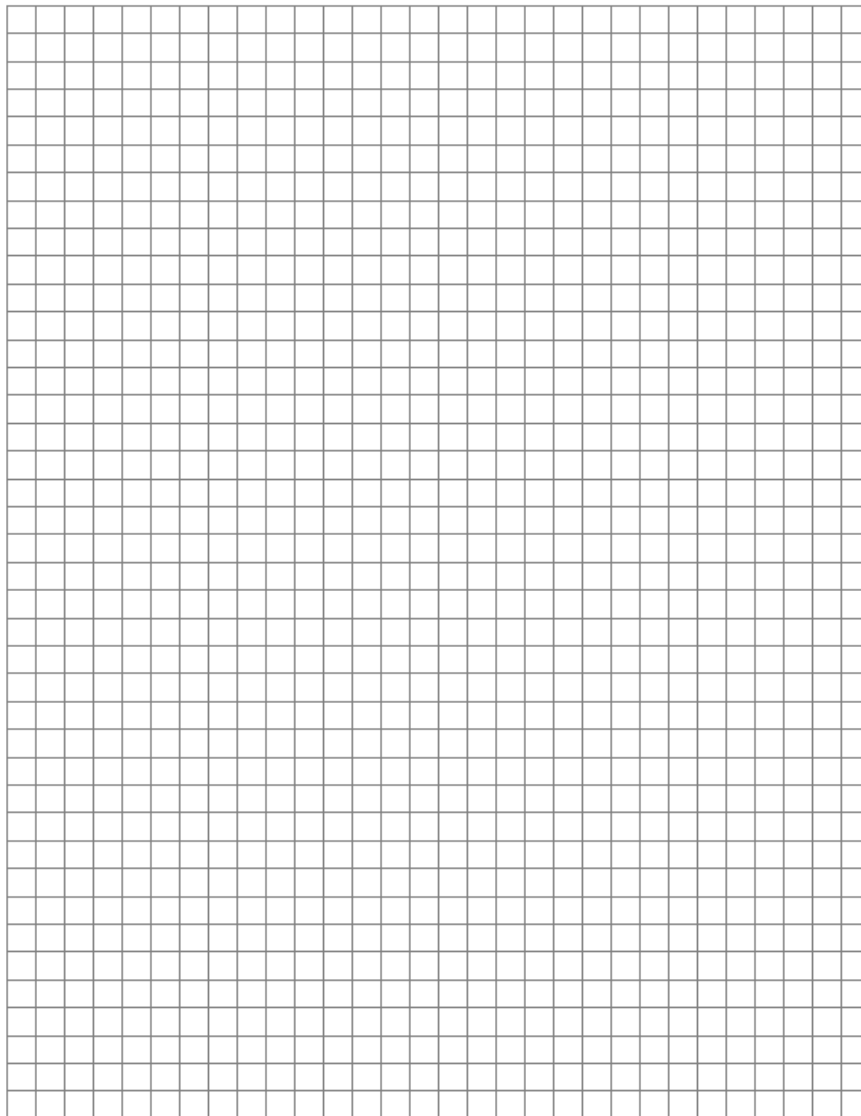


Using the information above, write an inequality for total amount earned in a month.

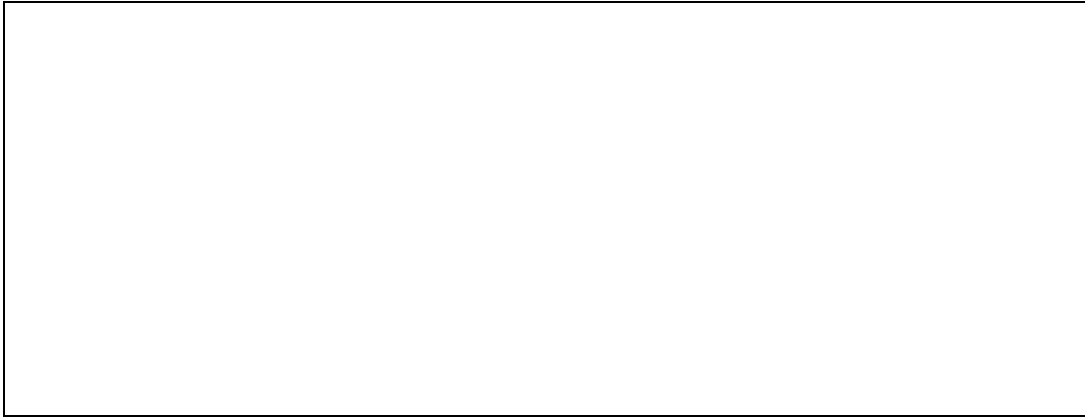
### Activity 3: Graph it!

You want to better understand the amount of hours you can work at both jobs, pay your bills, and still attend your classes and do well each week.

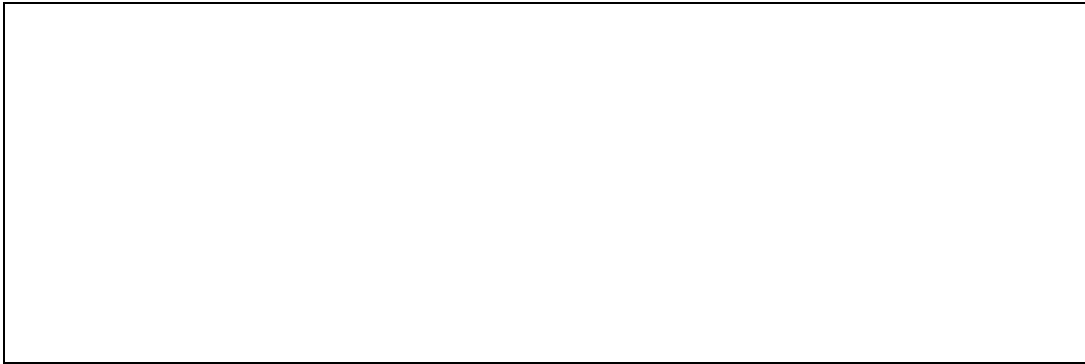
- a. Graph the system of inequalities from Activity 2 on a coordinate plane and label each line. You may use a [web-based graphing tool](#), a different tool of your choice, paper and pencil, or the graph paper provided below. Share your graph with your Tutor.



- b. Estimate the ordered pair where the lines intersect and explain what this intersection represents in the space below.



- c. What is a possible solution for this system of inequalities and what does this ordered pair represent? Place your answer in the space below.



- d. How many hours would you work at each job per week? Justify your answer in the space below.



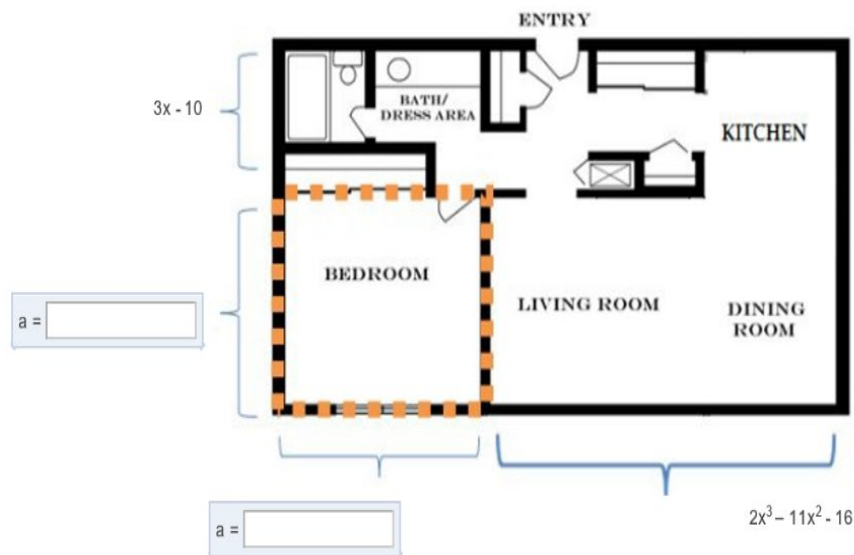
### Task 3: How big is my New Place?

You've decided on an apartment and are anxious to move in. Before moving in, your landlord told you that if you made minor renovations to the apartment, you would receive an additional refund. Your goal in task 3 will be to calculate and analyze various dimensions regarding your new space and to determine the areas you would like to cover with new carpet and paint.

#### Activity 1: How much space in your place?

Your landlord gave you a blueprint of the apartment you are moving into with some dimensions. Use the diagram below to answer the following questions. (Note: Drawings are not to scale.)

- a. You were told that the area of the bedroom is  $x^2 + 12x + 36$ . Factor the trinomial to find the length and width of the room represented as binomial expressions. Type your answers in the spaces provided in the drawing.



- b. Now that you have calculated the length of the bedroom/living room wall and the length of the living room/dining room is represented by the polynomial  $2x^3 - 11x^2 - 16$ , find the area of this space and simplify your answer. Show or explain your work in the space provided.

- c. Using the dimensions that were given and the dimensions you calculated, find the perimeter of the entire apartment as a simplified polynomial. Show or explain your work in the space provided.

## Activity 2: Time to remodel!

You would like to replace the carpet in your living room and need to calculate the area.

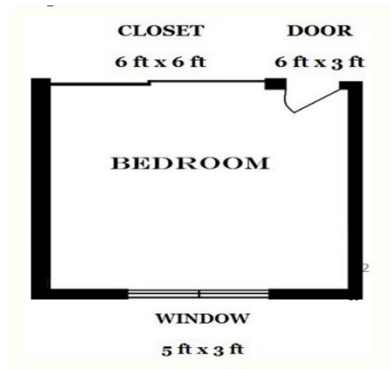
- a. If  $x = 6$ , what is the square footage of the living room. Show or explain your work in the space provided.

- b. However, carpeting is often sold in square yards. Approximately how many square yards of carpet do you need to buy to replace the flooring in your new living room? (Note: 1 sq. yd. = 9 sq. ft.) Show or explain your work in the space provided.

### Activity 3: Let's paint!

The bedroom color is terrible, and the first thing you want to do is repaint it.

- a. If  $x = 6$  ft. and the height of the walls is 9ft., what is the surface area of the four walls?  
(Note: Do NOT subtract for the windows and doors yet.) Show your work in the space provided.



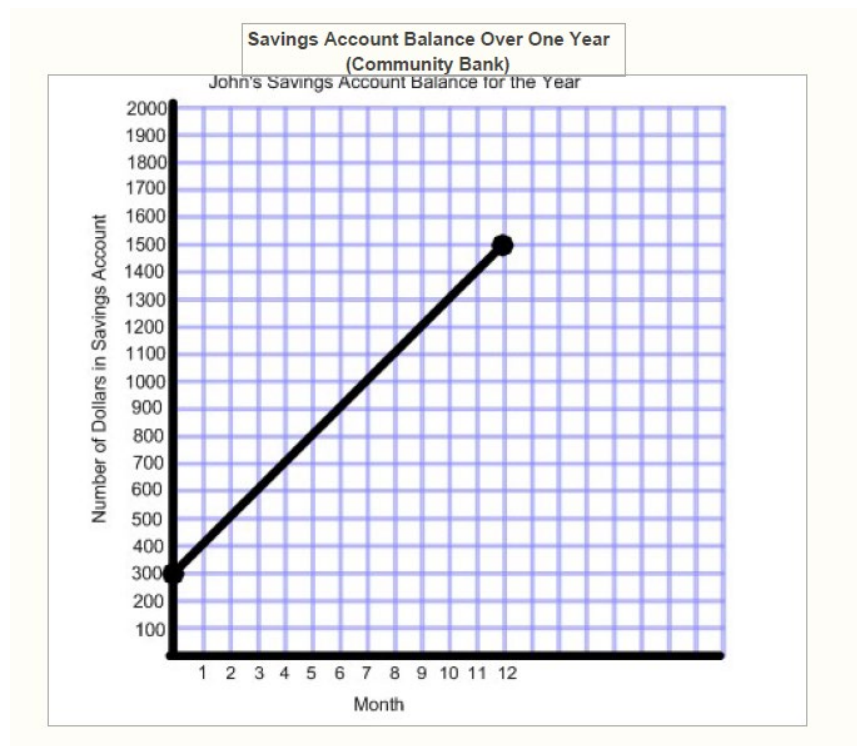
- b. But wait! You do not need to paint the door, the closet, and the window. What is the recalculated area using the information provided below? Refer to the diagram and determine the square footage of the surface area that you will actually be painting? Show your work in the space provided.

## Task 4: You Have a Place, Now it's Time to Save?

You decided on an apartment, you know how much you have to work and have made the necessary repairs. You realize the responsible thing to do is start saving some of your hard earned dollars. How can you increase your savings?

### Activity 1: Time to start saving!

You would like to start putting money away in a savings account and decide to start looking at banks for the best option. The bank gives you the graph below to show a projected savings plan over a year if you deposit the same amount every month.





a. Use the graph above to complete the table below.

| X (in months) | Y (in dollars) |
|---------------|----------------|
| 5             |                |
| 7             |                |
| 11            |                |

b. Identify the slope of the line and state what it represents in the space below.

c. Identify the y-intercept of the line and state what it represents in the space below.

- d. Use the graph and/or the table above to write the linear equation that represents the savings plan in the space below.

- e. Calculate how much money you save after two years if you do not withdraw any money and continue to make the same monthly deposit in the space below.

- f. How many months would it take to save \$3,000? Show your work in the space provided.

## Activity 2: More for your Money!

After looking at Task 4 Activity 1 (above), you decide that you want to have more money in your savings account after twelve months. Your goal is to save a total of \$2,400. There are various ways to achieve this and you will investigate two methods.

Method 1:

You decide that you are going to leave the initial deposit the same, but you still want to save \$2,400 after twelve months. Identify which part of your linear equation will change.

y-value

slope

y-intercept

x-value

Refer to Task 4, Activity 1, part d. Calculate a new linear equation based on the same initial deposit and changing your monthly deposit to result in a savings of \$2,400 after twelve months. Show your work in the space provided.

Method 2:

You decide that you are going to continue to deposit the same amount as you determined in Task 4, Activity 1, part b and change the initial deposit, but still you are still planning to have \$2,400 after twelve months of saving. Identify which part of your linear equation will change.

y-value

slope

y-intercept

x-value

Refer to Task 4, Activity 1, part d. Calculate a new linear equation based on the same monthly deposit and changing your initial deposit to result in a savings of \$2,400 after twelve months. Show your work in the space provided.

## Task 5: To Roommate or not to Roommate?

After careful calculation you have decided to look into getting a roommate. A roommate will be able to contribute at least \$600 per month for rent, utilities and cable and internet, how does the money from the roommate change the following?

Answer the following questions by either showing your work or explaining your reasoning?

- a. How does it change the equation of the total rent? Show or explain your work below.

- b. Your roommate will also be using utilities. How does this change the total cost of utilities? What about your portion of the utilities? Show or explain your work below.

- c. Because the amount of money you have to pay out will decrease with a roommate. How will this change the amount of hours you need to work each week at each job? Will you still need a second job? Show or explain your work below.

- d. Do you think getting a roommate will save you money over time? Explain your reasoning.