

Scaffolding Task: Summer Job

In order to raise money, you are planning to work during the summer babysitting and cleaning houses. You earn \$10 per hour while babysitting and \$20 per hour while cleaning houses. You need to earn at least \$1000 during the summer.

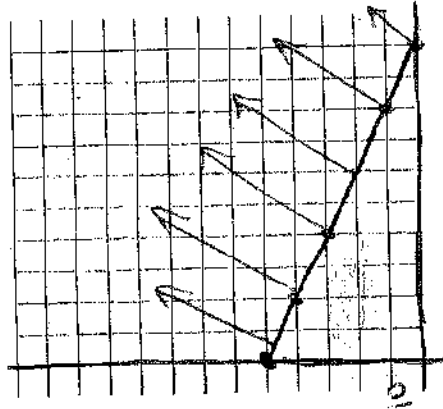
- Write an expression to represent the amount of money earned while babysitting. Be sure to choose a variable to represent the number of hours spent babysitting. **10b**

- Write an expression to represent the amount of money earned while cleaning houses. **20c**

- Write a mathematical model (inequality) representing the total amount of money earned over the summer from babysitting and cleaning houses. **$10b + 20c \geq 1000$**

$$10b + 20c \geq 1000$$

- Graph the mathematical model. Graph the hours babysitting on the x-axis and the hours cleaning houses on the y-axis.



$$10x + 20y \geq 1000$$

$$y \geq -\frac{1}{2}x + 50$$

- Use the graph to answer the following:

- Why does the graph only fall in the 1st Quadrant?
only positive hours worked
- Is it acceptable to earn exactly \$1000? What are some possible combinations of outcomes that equal exactly \$1000? Where do all of the outcomes that total \$1000 lie on the graph?
yes, (you examples), on the line
- Is it acceptable to earn more than \$1000? What are some possible combinations of outcomes that total more than \$1000? Where do all of these outcomes fall on the graph?
yes, (your examples), any points in shaded region
- Is it acceptable to work 10 hours babysitting and 10 hours cleaning houses? Why or why not? Where does the combination of 10 hours babysitting and 10 hours cleaning houses fall on the graph? Are combinations that fall in this area a solution to the mathematical model? Why or why not?

$$10 \geq -\frac{1}{2}(10) + 50$$

$$10 \geq -5 + 50$$

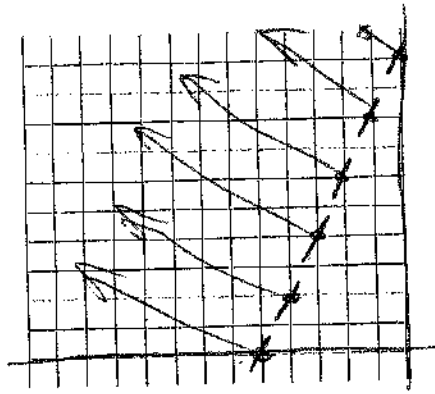
$$10 \geq 45$$

Not true → not acceptable, not shaded region

- How would the model change if you could only earn more than \$1000? Write a new model to represent needing to earn more than \$1000. How would this change the graph of the model? Would the line still be part of the solution? How would you change the line to show this? Graph the new model.

$$y > -\frac{1}{2}x + 50$$

**-line dashed
-no, don't include line**

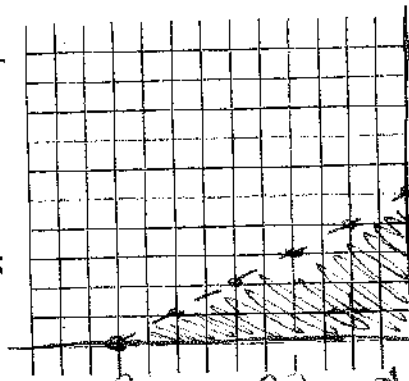


You plan to use part of the money you earned from your summer job to buy jeans and shirts for school. Jeans cost \$40 per pair and shirts are \$20 each. You want to spend less than \$400 of your money on these items.

- Write a mathematical model representing the amount of money spent on jeans and shirts.

$$40j + 20s < 400$$

- Graph the mathematical model. Graph the number of jeans on the x-axis and shirts on the y-axis.



$$40x + 20y < 400$$

$$20y < 400 - 40x$$

$$y < -2x + 20$$

- Why does the graph only fall in the 1st Quadrant?

Can't buy negative jeans & shirts

b. Is it acceptable to spend less than \$400? What are some possible combinations of outcomes that total less than \$400? Where do all of these outcomes fall on the graph?

yes, (your examples), shaded region

c. Is it acceptable to spend exactly \$400? How does the graph show this?

no, dashed line

d. Is it acceptable to spend more than \$400? Where do all of the combinations that total more than \$400 fall on the graph?

no, shaded below, above the line (not shaded)

Summarize your knowledge of graphing inequalities in two variables by answering the following questions in sentence form:

9. Explain the difference between a solid line and a broken line when graphing inequalities. How can you determine from the model whether the line will be solid or broken? How can you look at the graph and know if the line is part of the solution?

10. How do you determine which area of the graph of an inequality to shade? What is special about the shaded area of an inequality? What is special about the area that is not shaded?