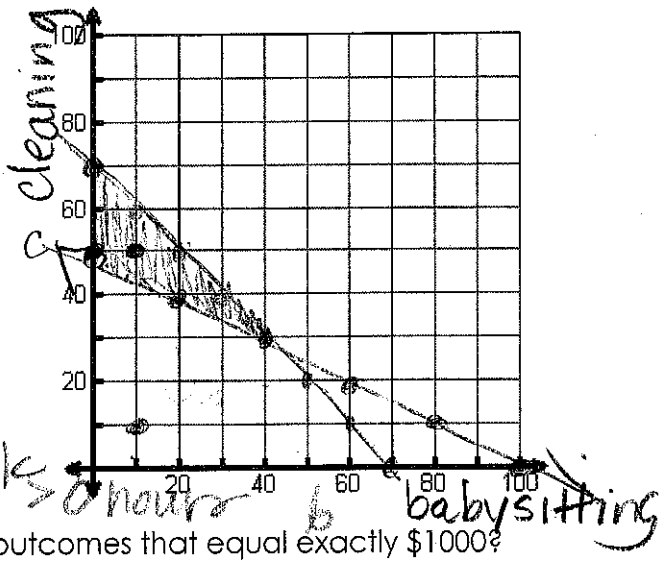
Name: _____ Date: key

Task: Summer Job

MCC9-12.A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

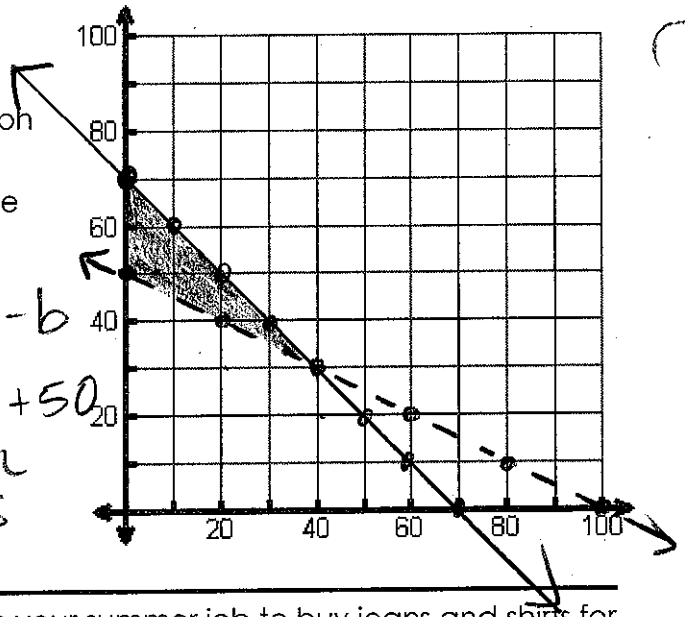
In order to raise money, you are planning to work during the summer babysitting and cleaning houses. You earn $10 per hour while babysitting and $20 per hour while cleaning houses. You need to earn at least $1000 during the summer. You don't want to work more than 70 hours.

1. 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.
   $10b$
2. Write an expression to represent the amount of money earned while cleaning houses.
   $20c$
3. Write a mathematical model (inequality) representing the total amount of money earned over the summer from babysitting and cleaning houses.
   $10b + 20c \geq 1000$ $-10b$
4. Write a mathematical model representing how many hours you expect to work at each job.
   $b + c \leq 70$
5. Graph the mathematical models. Graph the hours babysitting on the x-axis and the hours cleaning houses on the y-axis.
   $c \leq 70 - b$
   $c \geq -\frac{1}{2}b + 50$



6. Use the graph to answer the following:
   a. Why does the graph only fall in the 1st Quadrant? because time isn't negative, you only work $\geq$ 0 hours
   b. 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?
      (40, 30) (20, 40) (0, 50)
   c. 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, (20, 50) (10, 50) (0, 60) in the shaded area or on the equation
   d. 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?
      no, it doesn't earn $1000, not in the shaded area, no!

7. 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.



$b + c \leq 70$ $c \leq 70 - b$

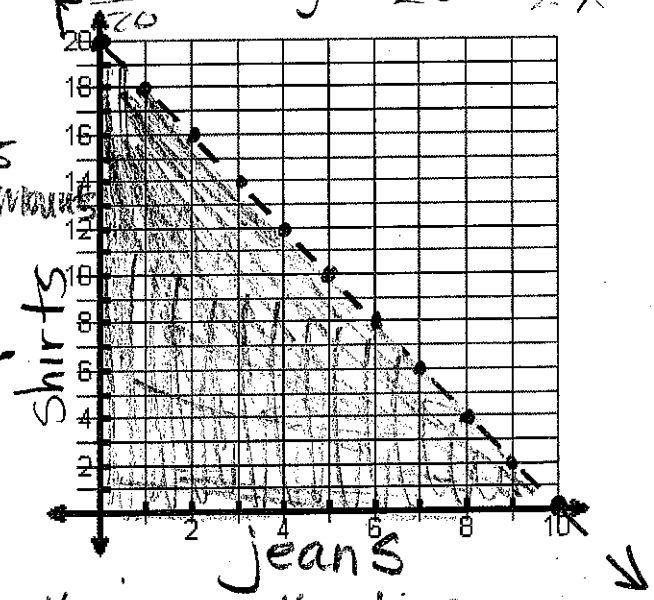
$10b + 20c > 1000$ $c > -\frac{1}{2}b + 50$

dashed line - so things on the line are not solutions

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.

8. Write a mathematical model representing the amount of money spent on jeans and shirts. $40j + 20s < 400$

9. Graph the mathematical model. Graph the number of jeans on the x-axis and shirts on the y-axis. $40x + 20y < 400$ $-40x$ $-40x$ $\frac{20y}{20} < \frac{400}{20} - \frac{40x}{20}$ $y < 20 - 2x$



a. Why does the graph only fall in the 1st Quadrant? cause you only buy > 0 jeans or shirts you don't buy negative amount

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, 2 jeans 8 shirts in the shaded area

c. Is it acceptable to spend exactly $400? How does the graph show this? no you can't be equal to anything on the 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, outside the shaded area