

Math Work Sample

Practice - Algebra

Name MAURER

Date _____

You are part of a group of tourists in Yosemite National Park who want to rent mountain bikes to ride around the Valley Floor. You arrive at the bicycle rental shop and see that there are two different rental plans:

Plan A: \$15 bike cleaning fee, plus \$2 per hour

Plan B: \$4 per hour, with a \$5 refund for returning a clean bike

The group doesn't know which plan is best for each person, so you volunteer to use your algebra skills to analyze the situation and answer the question: When is it better to use each plan?

The task is to find when each plan is cheaper.
 $x =$ number of hours, $y =$ cost of rental

Plan A

$$y = 2x + 15$$

Plan B

$$y = 4x - 5$$

Because both plans are in $y = mx + b$ form, I will use equal values, to find when the plans cost the same.

$$\text{Plan A} = \text{Plan B}$$

$$2x + 15 = 4x - 5$$

$$\begin{array}{r} -4x \quad -4x \\ -2x + 15 = -5 \end{array}$$

$$\begin{array}{r} -15 \quad -15 \\ -2x = -20 \end{array}$$

$$\begin{array}{r} -2x = -20 \\ \hline -2 \quad -2 \end{array}$$

$$x = 10$$

Plug in to find y

Plan A

$$y = 2(10) + 15$$

$$y = 20 + 15$$

$$y = 35$$

Plan B

$$y = 4(10) - 5$$

$$y = 40 - 5$$

$$y = 35$$

Strand: <u> x </u> algebra <u> </u> geometry <u> </u> statistics	Score:		
Standard(s): HS.A-CED.A (3) Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. HS.A-REI.C (6) Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables.	Making sense of the task	Representing and solving the task	
	Communicating reasoning	Reflecting and evaluating	Accuracy

Continued on Back

If you rent for 10 hours, each plan will cost the same, \$35.

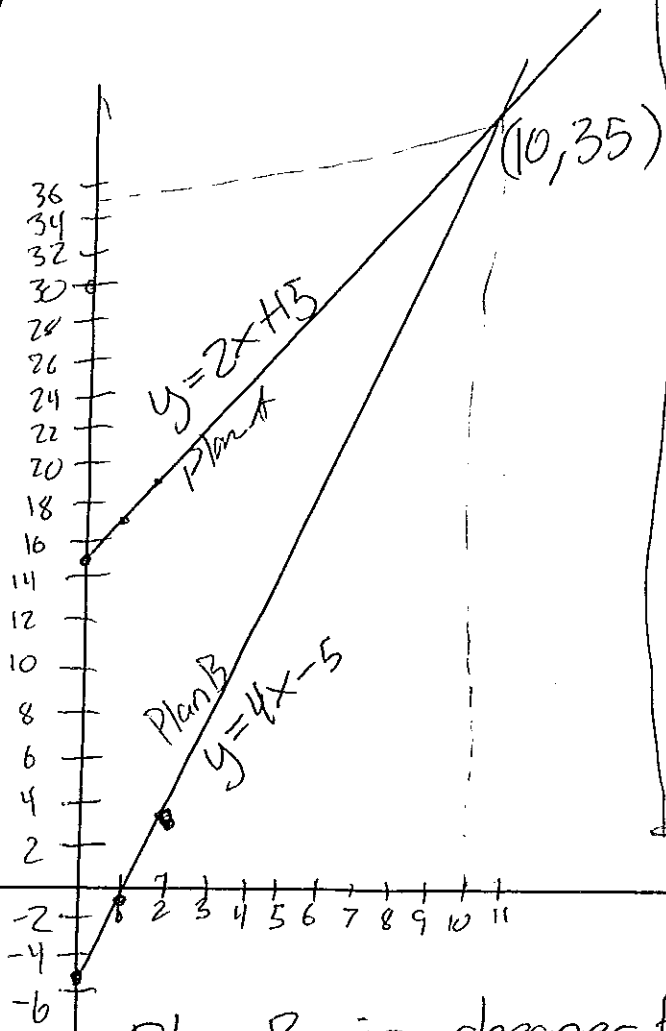
Graph

Plan A

$$y = 2x + 15$$

Plan B

$$y = 4x - 5$$



Table

Plan A

x	y
0	15
1	17
2	19
3	21
4	23
5	25
6	27
7	29
8	31
9	33
10	35
11	37

Plan B

x	y
0	-5
1	-1
2	3
3	7
4	11
5	15
6	19
7	23
8	27
9	31
10	35
11	39

The plans are equal at (10, 35). Plan A is more expensive before $x = 10$. Plan B is more expensive after $x = 10$.

Plan B is cheaper before 10 hours because its line is below Plan A. Plan A is cheaper after 10 hours because the lines switch places.