

Math Work Sample  
Practice - Algebra

Name MAURIER Date \_\_\_\_\_

Tony is buying a used car. He will choose between two cars. The table below shows information about each car.

Car	Cost	Miles per Gallon (mpg)	Estimated Immediate Repairs
car A	\$3200	18	\$700
car B	\$4700	24	\$300

Tony wants to compare the total costs of buying and using these cars.

- Tony estimates he will drive at least 200 miles per month
- The average cost of gasoline per gallon in his area is \$3.70
- Tony plans on owning the car for 4 years

Which car will cost Tony the least to buy and use?

$y = \text{cost of owning car}$   
 $x = \# \text{ of miles I drive}$

I will make an equation for the cost of each car. The cost depends on the miles I drive, the price of the car, and the immediate repairs.

Car A  
Costs:  $3200 + 700 = 3900$   
buy repair b

Car B  
Costs:  $4700 + 300 = 5000$   
buy repair b

Gas costs  $3.70 \div 18 \text{ mpg} = .205 \text{ per mile}$   
m

Gas costs:  $3.70 \div 24 \text{ mpg} = .15416$   
m

$y = .205x + 3900$

$y = .15416x + 5000$

Strand: <u>x</u> algebra _____ geometry _____ 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

Car A

$$y = .205x + 3900$$

Car B

$$y = .1541\bar{6}x + 5000$$

$$.205x + 3900 = .1541\bar{6}x + 5000$$
$$\quad -3900 \qquad \qquad -3900$$

$$.205x = .1541\bar{6}x + 1100$$
$$-.1541\bar{6}x \quad -.1541\bar{6}x$$

$$\frac{.0513\bar{8}x = 1100}{.0513\bar{8} \quad .0513\bar{8}}$$

$$x = 21,405.4054$$

$$y = .205(21,405.4054) + 3900$$

$$y = 4400 + 3900$$

$$y = 8300$$

$$y = .1541\bar{6}(21,405.4054) + 5000$$

$$y = 3300 + 5000$$

$$y = 8300$$

If you drive 21,405.4054 miles, both cars cost the same amount. If you drive less, then the cheaper car, Car A, is a better deal.

Tony drives 200 miles a month for 4 years.

So he drives at least  $200 \cdot 12 \cdot 4 = 9600$  miles.

Car A is cheaper.

Verify. Plug in 9600 miles to each car's equation

Car A

$$y = .205 \cdot 9600 + 3900$$

$$y = 5873.33$$

Car B

$$y = .1541\bar{6} \cdot 9600 + 5000$$

$$y = 6480$$

Car A is cheaper for Tony!