WKS **NAME** Answer Key
Period _____ **Date** _____

X. Graphing

Answer the following questions about graphing, and make the plots in #7 – #9. For the plots, read the instructions carefully to determine which variable is plotted on the x-axis and which is on the y-axis.

1) What do we call the variable that is controlled? Which axis does it go on?
The independent variable; the x-axis (horizontal axis).

2) What do we call the variable that we are studying? Which axis does it go on?
The dependent variable; the y-axis (vertical axis)

3) When asked to plot "Temperature of Water as a Function of Time," which variable is described by #1 above, and which by #2 above?
Time is the independent variable (x-axis), temperature of water is the dependent variable (y-axis)

4) When the data plotted represent a straight line, what kind of relationship is it? direct

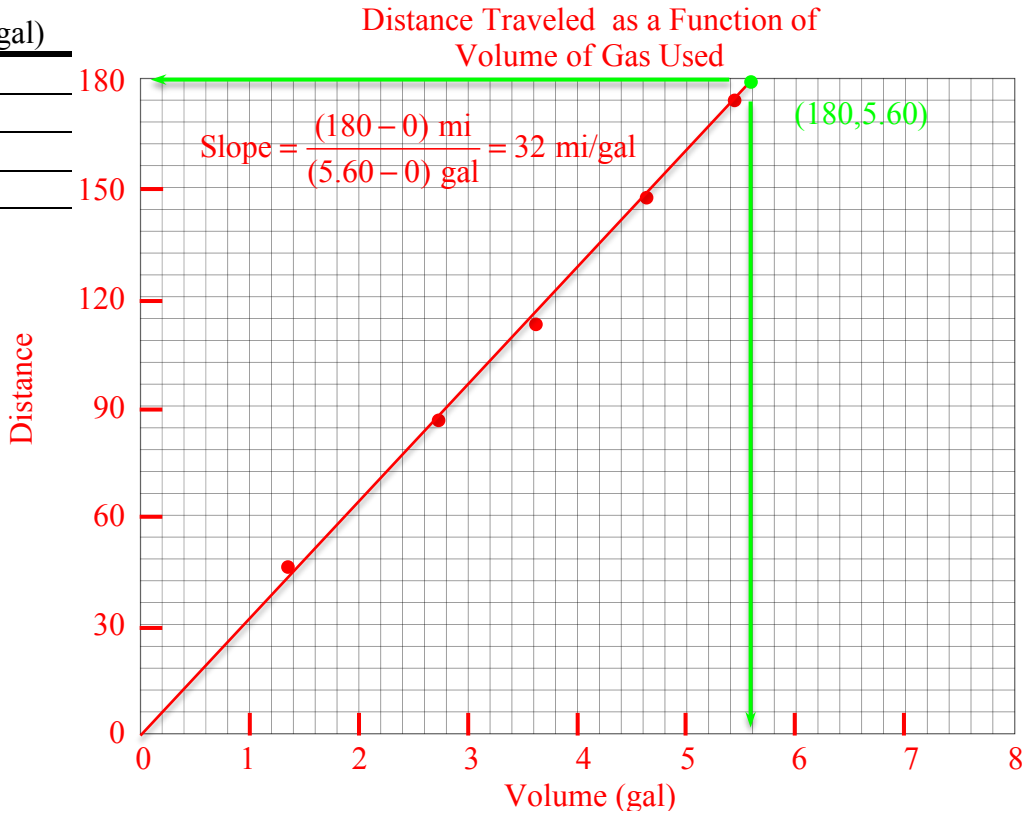
5) What kind of relationship is represented by a rapidly decreasing curve? indirect/inverse

6) How can we make the graph in #5 into a linear graph, as in #4? Plot y vs. 1/x (x^{-1})

7) Use the sample data of Distance Traveled vs. Volume of Gas used below to construct a graph on the grid. Be sure to label the graph and both axes, and to take up as much of the graph as possible. Draw the best fit straight line through the data, then use two points ON THE LINE to determine the slope. What are the units of the slope and what might it represent?

Distance (mi)	Volume (gal)
45	1.35
86	2.75
112	3.60
148	4.61
175	5.42

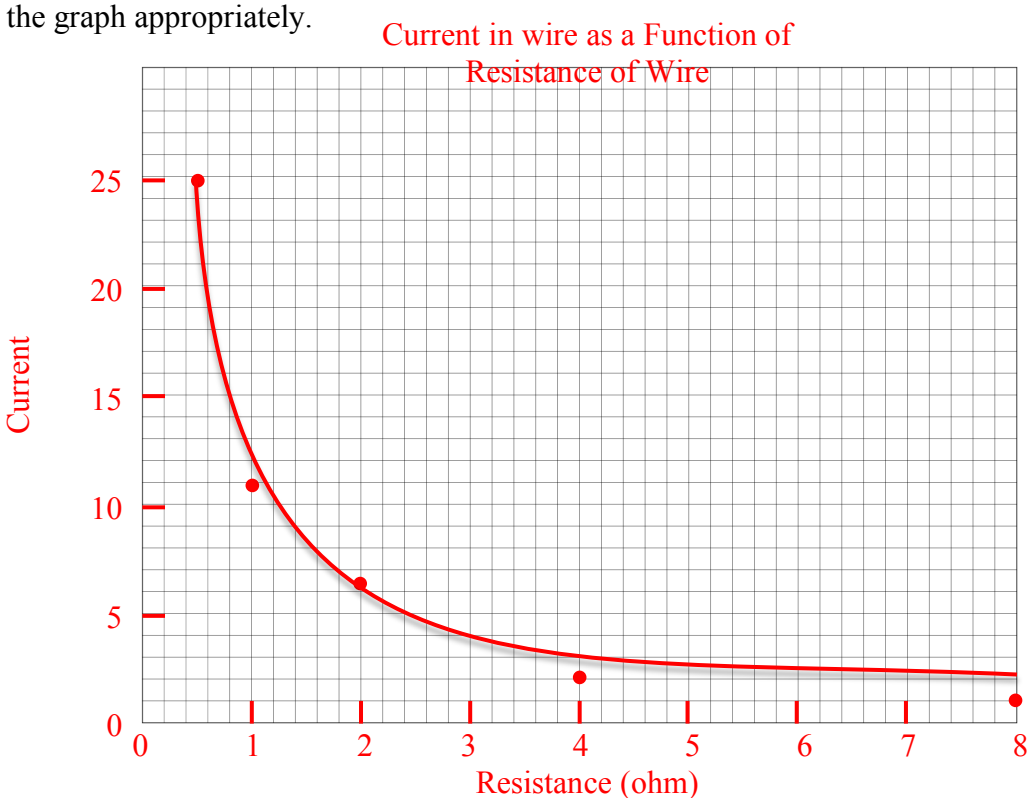
The units of the slope are miles per gallon, and represent the average fuel consumption for this trip.



Turn page over!

8) In electronics, current (I) is an inverse function of resistance (R) at constant voltage (V). Plot the sample data of Current vs. Resistance on the first plot and draw the best fit *smooth curve* through the points. Don't forget to label the graph appropriately.

R (ohms)	I (amps)
0.50	25
1.0	11
2.0	6.5
4.0	2.9
8.0	1.6



9) For the second graph determine the *inverse resistance* , 1/R, from the first data table by dividing 1 by R from the first plot, and use this as your new *independent* variable. I have provided the first calculation to show you how to make the calculation. Plot Current vs. Inverse Resistance on the second plot.

Determine the slope of this line. Since $I = \frac{V}{R} = V \bullet \frac{1}{R}$, the slope represents the voltage, with units of V (volts).

1/R (1/ohms)*	I (amps)
2.0	25
1.0	11
0.50	6.5
0.25	2.9
0.12	1.6

*1/R = 1/0.50 = 2.0