1. Sketch the appropriate graphs for the following power functions. *Assume that the parameter k is positive for all equations.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1.
 | 1.
 | 1.
 | 1.
 | 1.
 |
| 1.
 | 1.
 | 1.
 | 1.
 | 1.
 |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.

 | 1.

 | 1.

 | 1.

 |
| 1.

 | 1.

 | 1.

 | 1.

 |
| 1.

 | 1.

 |  |  |

1. Which of the above functions represent directly proportional power functions and which functions represent indirectly proportional power functions?
2. Which of the above functions go through the origin (**the point (0, 0)**)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which of the above functions have asymptotes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What can be said about ALL directly proportional power functions?
5. What can be said about ALL indirectly proportional power functions?
6. The table below shows the weight and diameter of various sassafras trees.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Diameter, *d* (cm) | 5.6 | 6.5 | 11.8 | 16.7 | 23.4 |
| Weight, W (kg) | 5.636 | 7.364 | 30.696 | 76.730 | 169.290 |

* 1. Should this relationship be modeled by a linear function? Justify your reasoning.
	2. Plot this data on your calculator. Let *d* be the independent variable and let *W* be the dependent variable.
	3. After looking at the scatterplot, do you think that it might be possible to model this relationship with an exponential function?
	4. Find the exponential regression model for this data. Use function notation. Round to 3 decimal places.
	5. Plot the exponential regression function along with the data. Does this function model the data well?

* 1. Identify the vertical intercept.
	2. Interpret the vertical intercept from **part f** within the context of the situation.
	3. Does the vertical intercept from the model make sense in the context of the situation? What do you think would be a reasonable vertical intercept?

What type of function has this vertical intercept?

* 1. Find the power regression model for this data (Select **A: PwrReg**). Use function notation. Round to 3 decimal places.
	2. Plot the power regression function along with the data. Does the exponential function or power function model the data better? Explain.

**Lab Follow-Up PART 2: -- Due Monday, March 31 -** Complete the table by describing the characteristics of each function.

|  |  |  |
| --- | --- | --- |
|  | **Directly Proportional Power Function** | **Indirectly Proportional Power Function**  |
| Assume that the constant of proportionality, *k*, is positive |
| p even | p odd | 0 < p < 1 | p even | p odd |
| 1. General Form
 |  |  |
| 1. Graph
* Sketch a graph of the function
 |  |  |  |  |  |
| 1. Overall function behavior (in the first quadrant – upper right hand corner):
* Is the function increasing or decreasing?
 |  |  |  |  |  |
| 1. Average Rate of Change (in the first quadrant- upper right hand corner):
* Is the average rate of change constant, increasing or decreasing?
 |  |  |  |  |  |
| 1. Horizontal Intercepts:
* Are there horizontal intercepts?

(Yes or No?) |  |  |  |  |  |
| 1. Vertical Intercepts:
* Is there a vertical intercept?

(Yes or No?) |  |  |  |  |  |
| 1. Horizontal Asymptote:
* Is there a horizontal asymptote?

If so, what is the equation? |  |  |  |  |  |
| 1. Vertical Asymptote:
* Is there a vertical asymptote?

If so, what is the equation? |  |  |  |  |  |
| 1. Domain
	* Identify the domain of the function.
 |  |  |  |  |  |
| 1. Range
	* Identify the range of the function.
 |  |  |  |  |  |
| 1. End Behavior
* Describe the end behavior of the function.
 |  |  |  |  |  |

**Lab Follow-Up PART 2: -- Due Monday, November 11 -** Use the spreadsheet created to answer the questions below.

1. Does the Pendulum Lab appear to be a directly proportional power function? \_\_\_\_\_\_\_\_\_\_

Justify your answer with three characteristics from the spreadsheet. Characteristics can be listed in bullet form, but must be explained.

1. Does the Pendulum Lab appear to be an indirectly proportional power function? \_\_\_\_\_\_\_\_\_\_

Justify your answer with three characteristics from the spreadsheet. Characteristics can be listed in bullet form, but must be explained.