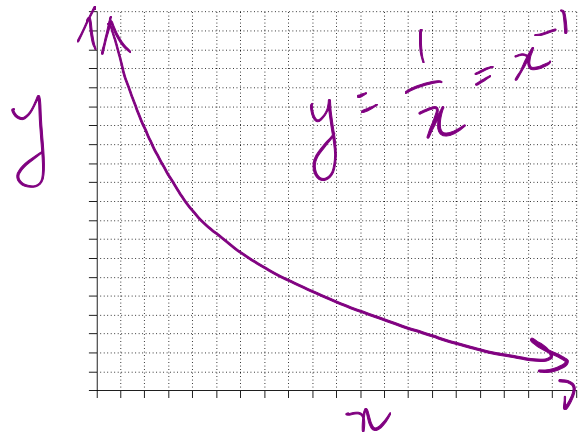
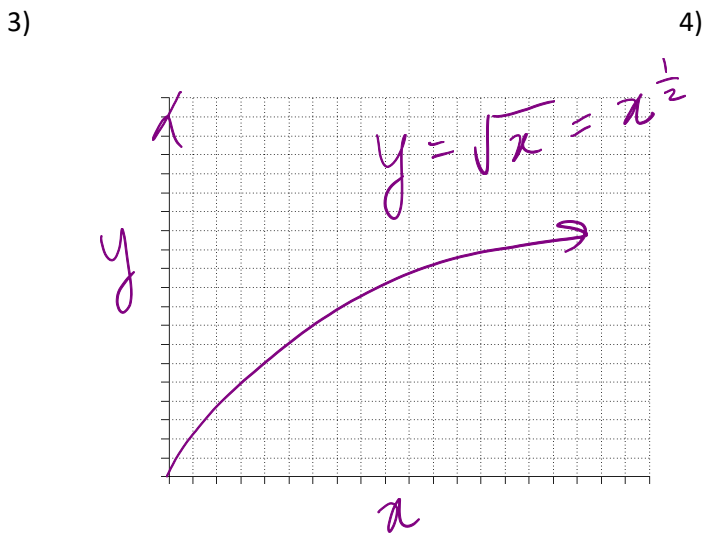
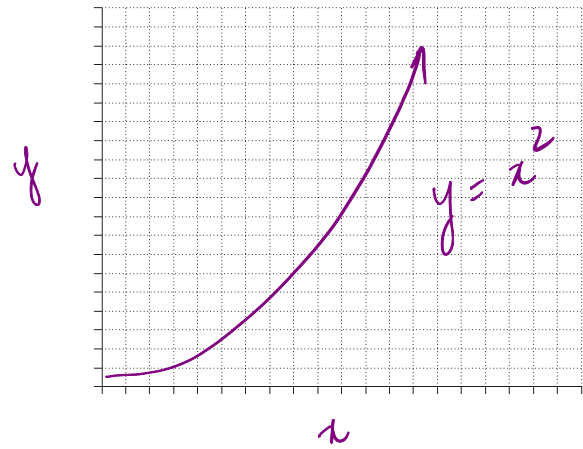
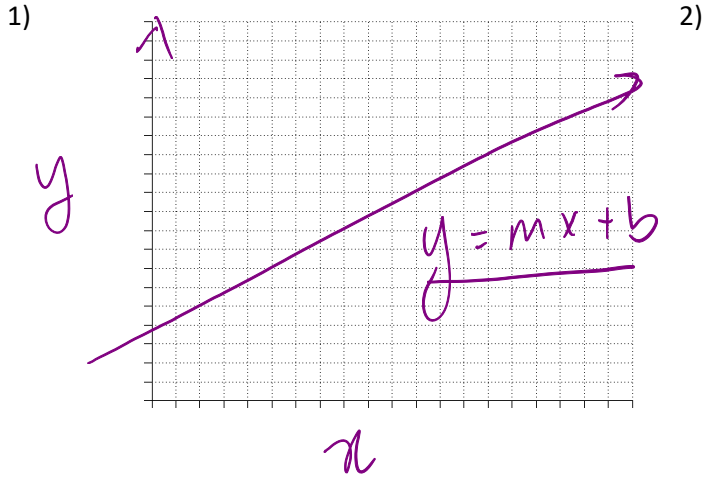


**Graphing: Linearization**

You may have seen the following graphs below:



You might notice that a best fit line does not work so well in most of the above situations.

Which one of these graphs best fit your data? \_\_\_\_\_

$$y = \sqrt{x}$$

Since it is difficult to quantitatively analyze your graph, it is better if we **linearize** your graph. In other words, “straighten out” your graph. It is much easier to calculate slope from a linear graph than from a curved graph.

With a graph in the form of  $y = mx + b$ , it will be much easier to measure the slope.

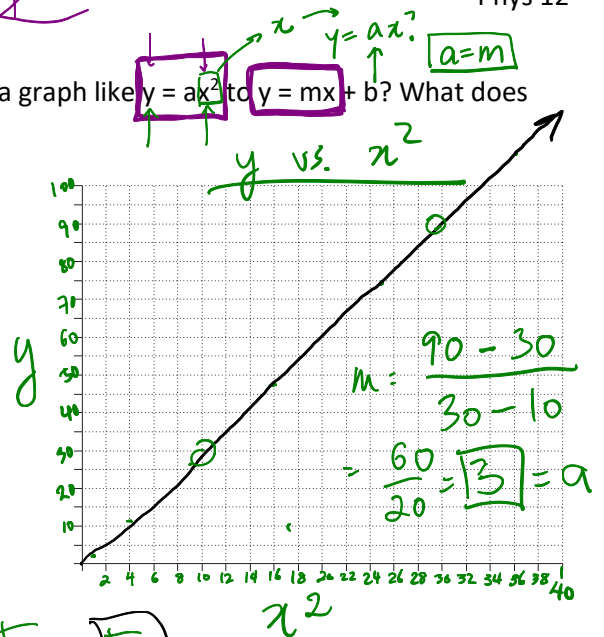
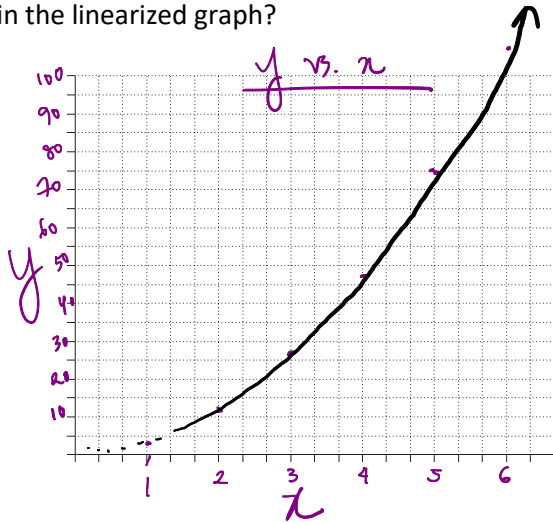
Name: \_\_\_\_\_

$$T = 2\pi \sqrt{\frac{M}{X}}$$

Example 1:

Let's say we want to figure out what "a" is in  $y = ax^2$ . How do we convert a graph like  $y = ax^2$  to  $y = mx + b$ ? What does the slope "m" mean in the linearized graph?

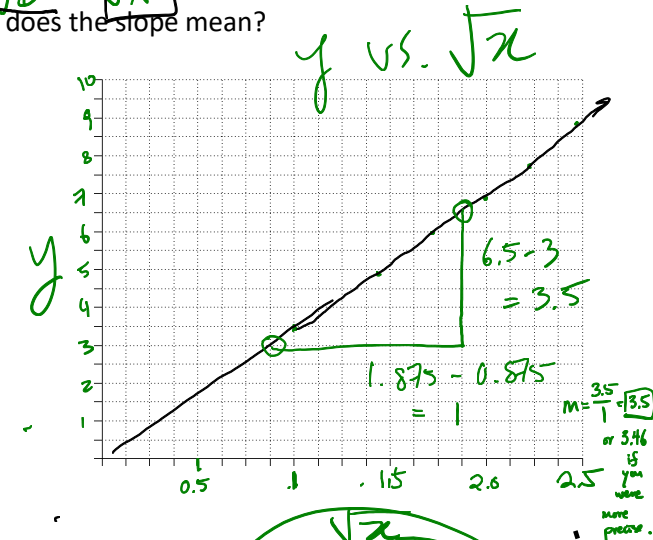
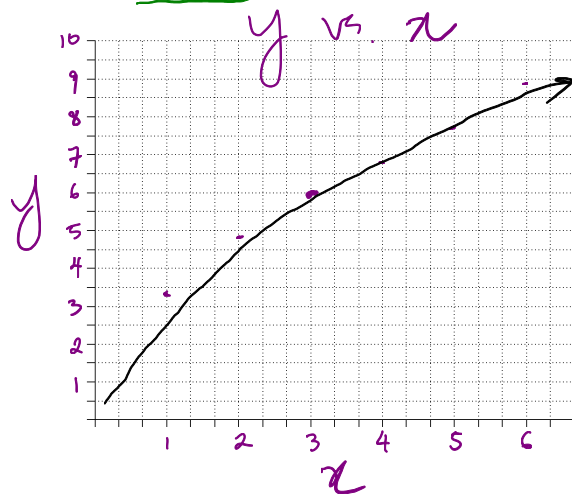
x	$x^2$	y
1	→ 1	3
2	→ 4	12
3	→ 9	27
4	→ 16	48
5	→ 25	75
6	→ 36	108



Example 2:

How do we convert a graph like  $y = a\sqrt{bx}$  to the  $y = mx + b$  form? What does the slope mean?

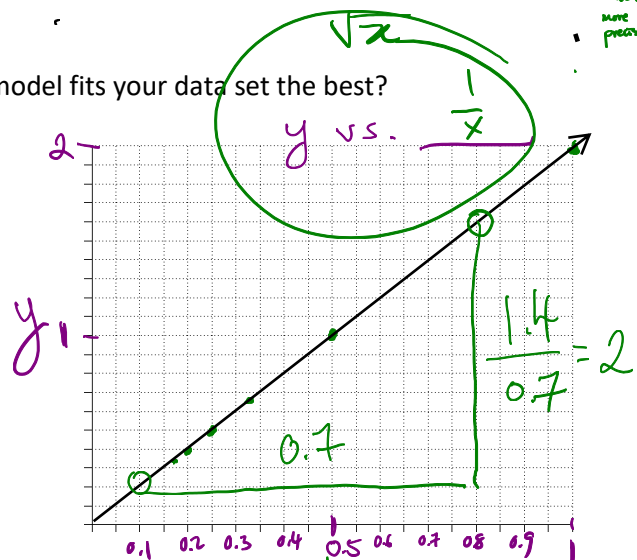
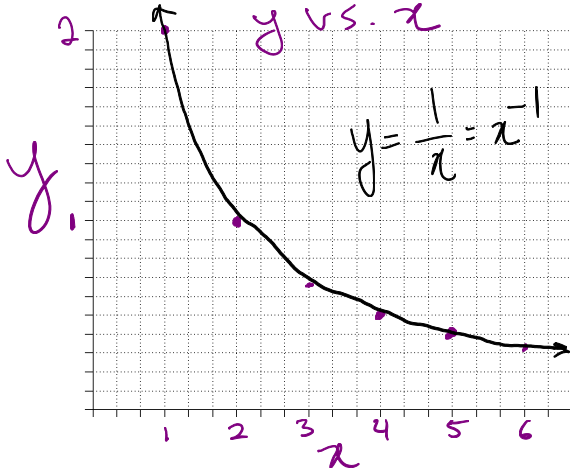
x	$\sqrt{x}$	y
1	→ 1	3.46
2	→ 1.41	4.90
3	→ 1.73	6
4	→ 2	6.93
5	→ 2.24	7.75
6	→ 2.45	8.49



$$3.5 = a\sqrt{5}$$

Draw the graph for the following data and linearize the 2<sup>nd</sup> graph. What model fits your data set the best?

x	$\frac{1}{x}$	y
1	→ 1	2
2	→ 1/2	1
3	→ 1/3	2/3
4	→ 1/4	1/2
5	→ 1/5	2/5
6	→ 1/6	1/3



Extra practice: Find the best fit slope of the linearized graphs above.

$$y = \frac{1}{x} \rightarrow y = a \frac{1}{x} = \frac{2}{x}$$