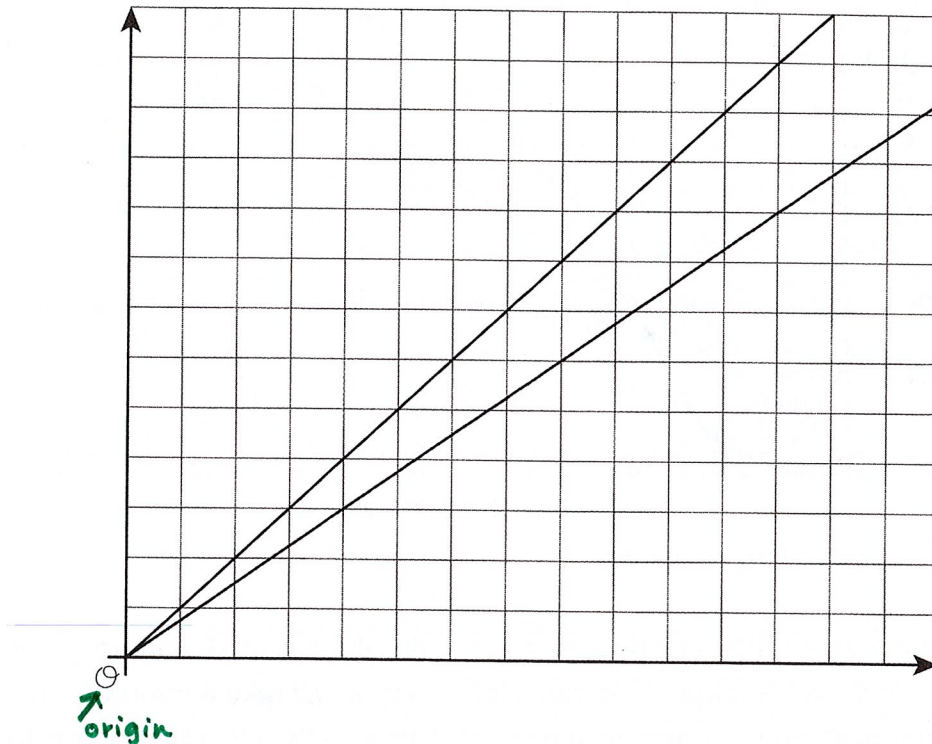


Lesson 1 Summary

Graphing is a way to help us make sense of relationships. But the graph of a line on a coordinate axes without scale or labels isn't very helpful. For example, let's say we know that on longer bike rides Kiran can ride 4 miles every 16 minutes and Mai can ride 4 miles every 12 minutes. Here are the graphs of these relationships:

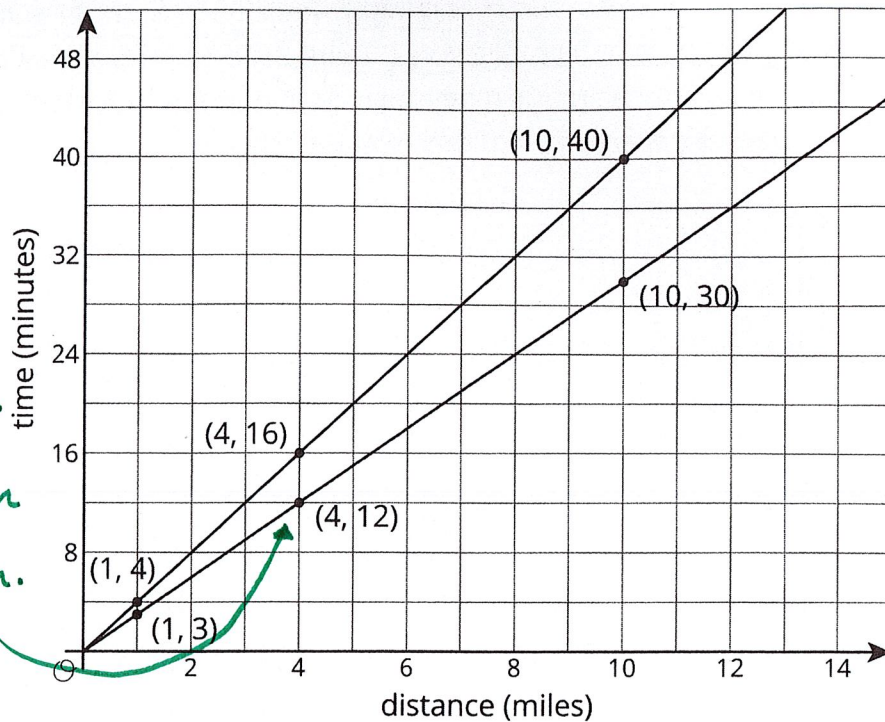


Without labels we can't even tell which line is Kiran and which is Mai! Without labels and a scale on the axes, we can't use these graphs to answer questions like:

1. Which graph goes with which rider?
2. Who rides faster?
3. If Kiran and Mai start a bike trip at the same time, how far are they after 24 minutes?
4. How long will it take each of them to reach the end of the 12 mile bike path?

Here is the same graphs as above, but now with labels and scale:

* Smaller k = less steep line, moving faster pace
 4mi in 12min vs. 4mi in 16min.



Ex: $y = \frac{1}{2}x$ double the pace $\frac{1}{2} \div 2 = \frac{1}{4}$
 $\frac{1}{2} \cdot 2 = 1$
 $y = \frac{1}{4}x$
 $k = \frac{1}{4}$

Revisiting the questions from earlier:

- Which graph goes with each rider? If Kiran rides 4 miles in 16 minutes, then the point (4, 16) is on his graph. If he rides for 1 mile, it will take 4 minutes. 10 miles will take 40 minutes. So the upper graph represents Kiran's ride. Mai's points for the same distances are (1, 3), (4, 12), and (10, 30), so hers is the lower graph. (A letter next to each line would help us remember which is which!)
- Who rides faster? Mai rides faster because she can ride the same distance as Kiran in a shorter time.
- If Kiran and Mai start a bike trip at the same time, how far are they after 20 minutes? The points on the graphs at height 20 are 5 miles for Kiran and a little less than 7 miles for Mai.
- How long will it take each of them to reach the end of the 12 mile bike path? The points on the graphs at a horizontal distance of 12 are 36 minutes for Mai and 48 minutes for Kiran. (Kiran's time after 12 miles is almost off the grid!)

* Double the pace $k \div 2$
 Triple the pace $k \div 3$

* $k = \frac{y}{x}$ or $y = kx$ k is the constant of proportionality

* Pace $\frac{t}{d}$ * Speed $\frac{d}{t}$

* Read all questions before you choose your scale