QS&BB

Quarks, Spacetime, and the Big Bang

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Worksheets to accompany the QS&BB lessons for ISP220,
Spring 2019.

Contents

Lesson 4
Motion, Getting From Here to There

Please use your fingers:

📖🖋️ **The speed story**

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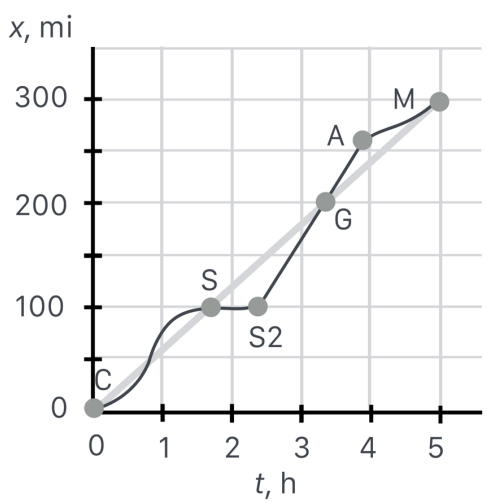
> **you do it: Saginaw to Grayling**

Turn the model for motion around and solve it for the time difference. Then calculate the time in hours that it took to go from Saginaw to Grayling.

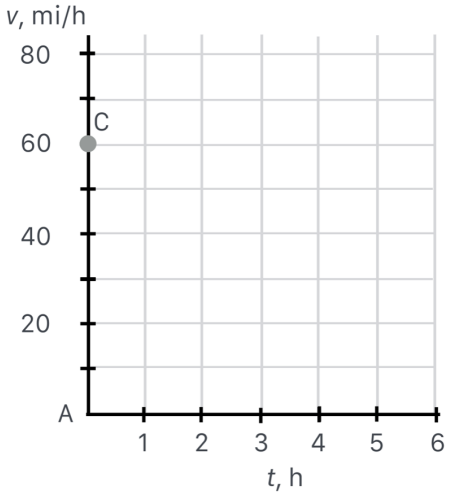
you do it: taking a trip

Notice that we started slow (traffic) and sped up after about 50 miles.

1. *What happened between S and S2?*
2. *Plot the speed on (b) between S and S2.*
3. *After getting back on the road, we sped up quite a bit. Estimate our average speed between S2 and A. You'll need a ruler.*
4. *What was the average speed for the whole trip? (That's a trick question!)*



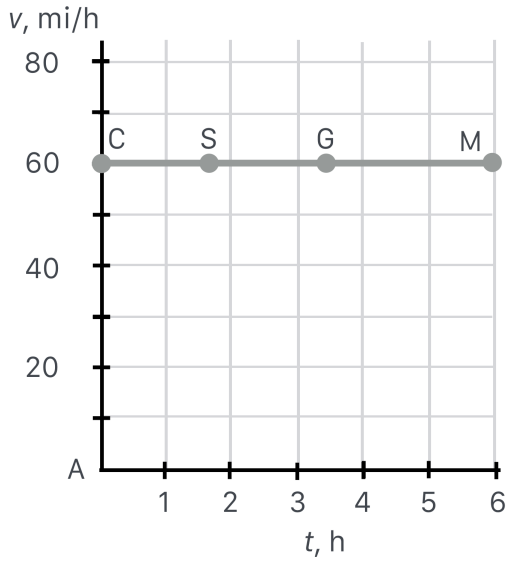
(a)



(b)

you do it: Saginaw to Grayling, again

Go back to our original, idealized trip at a constant speed of 60 mph and look at the (b) figure on the right of the speed. If the distance between Saginaw and Grayling is 100 miles, how long does it take to make that part of the ideal journey? Think about rectangles and draw it on the diagram in the workbook and estimate its area under the curve defined by S and G.



Please use your fingers:

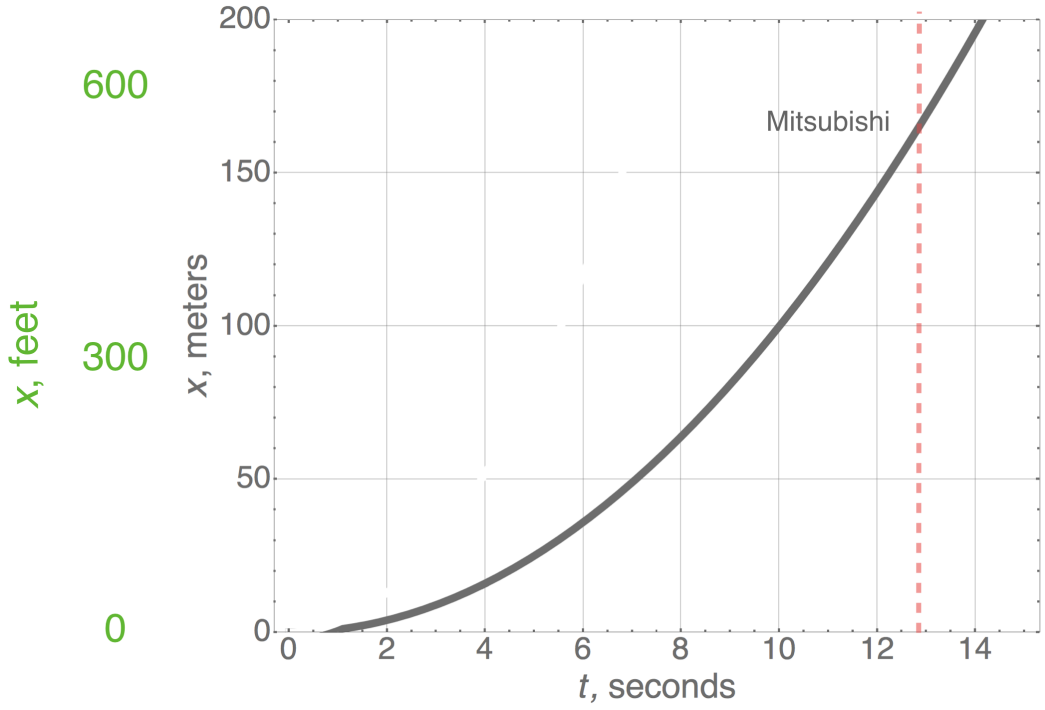
 **the fast ride**

> **you do it: titlefromlesson**

Look at the plots of free-fall using $g = 10$ m/s^2 in Lesson 4. How far would an object fall in 3 seconds? And, how fast would it be going at that point? Ignore air resistance and approximate $g = 10$ m/s^2. Oh wait. That's what the graphs show.

you do it: the Porsche distance

In the workbook, plot 4 points for the Porsche's distance at 1, 2, 4, and 6 seconds. Then draw a smooth curve through those points. How far do you estimate that the Porsche went in the 4 seconds that it took to reach 60 mph?



Please use your fingers:

 **SS Nimitz**

Notes, Dictionary, Formulas

Notes, Dictionary, Formulas

Lesson 5
Momentum and Force

Notes, Dictionary, Formulas

Notes, Dictionary, Formulas