CMC –South 2014
Session 470

The Task at Hand:
Making Tasked-Based Learning Work for You

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Sample Lessons

1) Task 1.12: Riding to the Lake
2) Task 2.8: Kevin Durant is Gatorade Dreamin'
3) Task 3.5: Clash of Clones
4) Complete Unit 1 **Online Only**

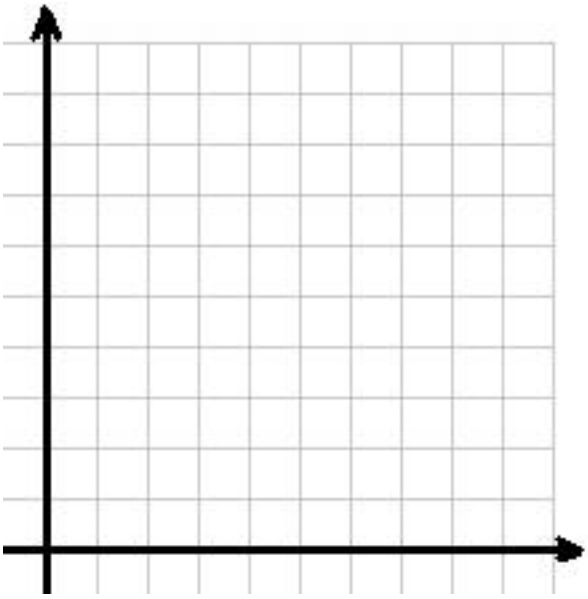
1.12: Riding to the Lake

PART 1:

This summer I spent 3 weeks in Park City, Utah which has a great system of bike paths. I decided to ride one of the paths to a lake. The lake was ten miles away on the path from the hotel where I was staying. I left at 12:00 PM and planned to return by 4:00 PM to get ready to go out for dinner with some friends.

Assume ***f(t)*** is a position function that measures my distance from the hotel from the time I left to the time I returned where *t* is measured in ***hours since*** 12:00 PM.

Sketch one possible graph of ***f(t)*** to represent my trip to the lake on the axis shown below. Provide a detailed story to match your graph. Then answer the ten questions on the following page. Since you will be using your graph to answer the questions it is ***recommended that you read the ten questions before creating your graph and story***. (7 points possible)



Story:

Use your graph of *f(t)* to answer the following questions:

1) What is the domain *f(t)*? (2)

2) What is the range? (2)

3) According to your graph, at *what time* did I get to the lake? (2)

4) According to your graph, what is *f(1)*? What does this answer represent? (2)

5) According to your graph what was my average velocity ***on the way to the lake***? (3)

6) According to your graph, on which interval(s) was *f(t)* decreasing? How does that match your story? (2)

7) Is your version of *f(t)* continuous or discrete? Explain why. (2)

8) What was the maximum value of *f(t)*. What does that represent in the story? (2)

9) We know *f(t)* is a function. Explain why this is obvious based on what it represents in the real world. (2)

10) For each part of this problem you will get one point for an answer that makes sense, one point for a justification of your answer, and one point for correctly making use of one of the vocabulary words listed below in your justification:

domain	*constant*	*maximum*
range	*velocity*	*minimum*

How would (or why wouldn't) your graph of *f(t)* change if I told you…

a) I went past the lake to see a waterfall further down the path? (3)

b) I stayed at the lake too long and got back late after hurrying back? (3)

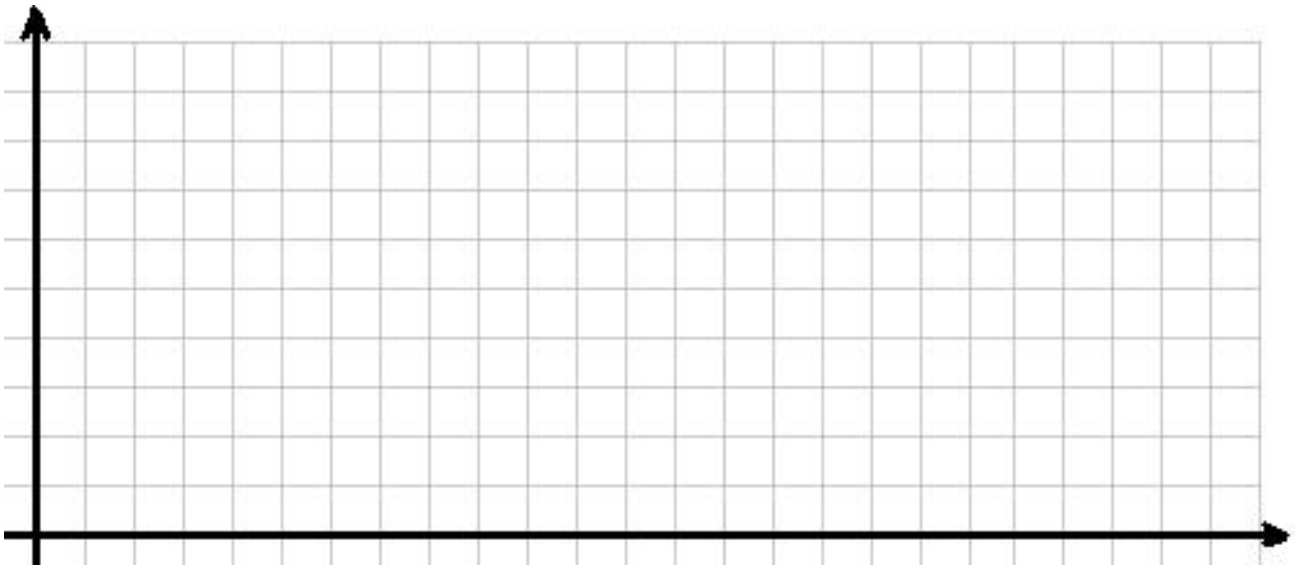
c) I went swimming in the lake? (3)

PART 2: Complete the graph and the table using the given information.

In Part 1 of this Task you were asked to make up information about my ride to the lake. However, the real details of that ride had not been revealed. Since it was a while back I can't remember all the details either, but here's what I was able to remember:

- My average velocity during the first 30 minutes was 10 miles per hour.
- 45 minutes after I left I stopped for 5 minutes to take pictures of some wildlife.
- At 1:00 I was 8 miles along the bike path (2 miles from the lake).
- I arrived at the lake at 1:30.
- I spent one hour at the lake.
- I never went further than 10 miles from my hotel.
- From 2:30 to 3:30 I was riding back with an average velocity of 8 miles per hour.
- At 3:00 exactly I was riding faster than I had all day (around 15 mph).
- 3.5 hours after I left I stopped to rest for 15 minutes.
- I got back to the hotel right on time.

Minutes (after 12:00)	Miles (from hotel)
0	
30	
60	
90	
150	
210	
225	
240	



2.8: Kevin Durant is Gatorade Dreamin'

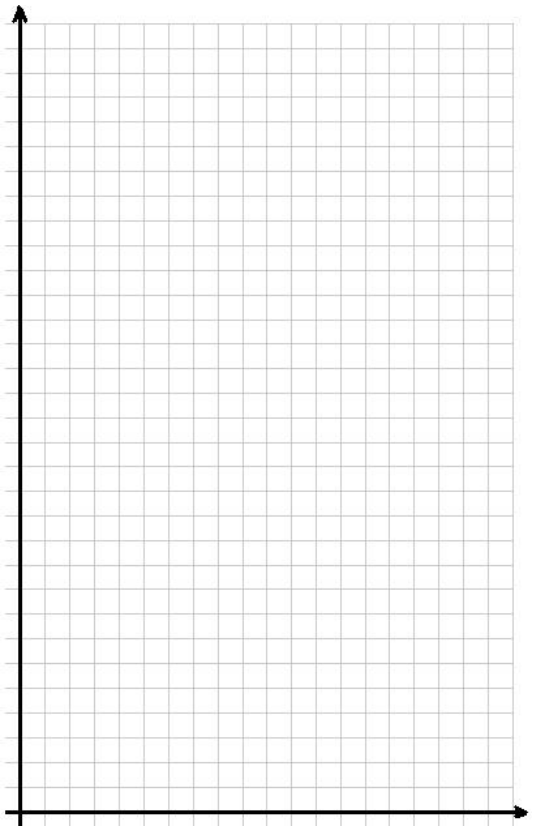
After a nightmare that he can't dunk on Dwayne Wade, Kevin Durant starts working out like crazy. Check out the video: http://youtu.be/wNjQishYOy0

After one workout KD is so thirsty that he can drink a whole 32-ounce bottle of Gatorade. The equation *G(t)* below represents *the number of ounces of Gatorade Kevin Durant has consumed t seconds after he started drinking* a fresh bottle of Fruit Punch (aka "Red") Gatorade.

$$G(t) = \begin{cases} 4t & 0 \le t < 4 \\ 16 & 4 \le t < 6 \\ 3t - 2 & 6 \le t < 10 \\ 28 & 10 \le t < 18 \\ 2t - 8 & 18 \le t \le 20 \end{cases}$$

1. *Use the equation* to find *G(3).* What does your answer represent?

2. Graph *G(t).*



3. How many ounces of Red Gatorade has Kevin Durant consumed after 15 seconds?

4. On what intervals does *G(t)* remain constant? What does this represent in terms of Kevin Durant's Gatorade drinking?

5. Is it possible for *G(t)* to decrease in this scenario? Explain your answer.

6. What is the maximum value of this function? Why doesn't the function go any higher?

7. During which time interval was KD drinking his Gatorade the fastest? How do you know?

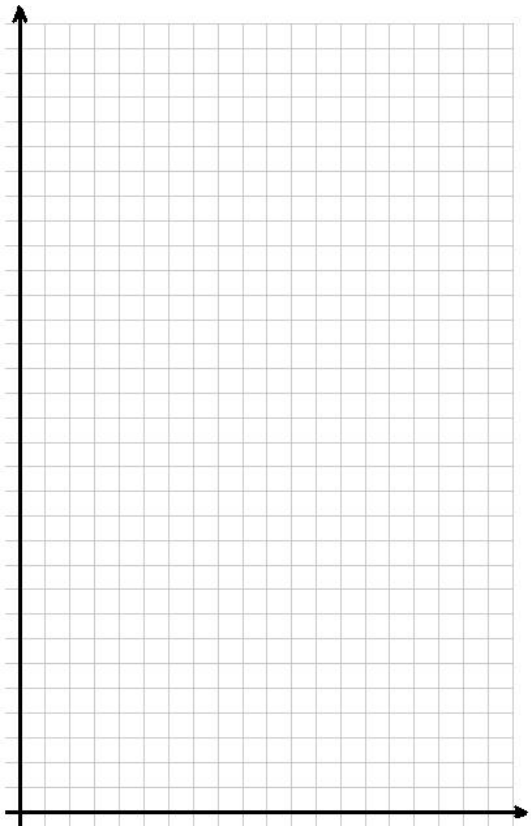
8. How long did it take Kevin Durant to finish the bottle of Gatorade?

9. How many roots does *G(t)* have? Where are they, and what do they represent?

Now think about the function *L(t)*, ***the amount of Gatorade left in KD's bottle*** *t seconds after he starts drinking.*

10. What is *L(0)*? Explain your answer.

11. Graph *L(t).*



12. Use the graph to write an piece-wise linear equation for *L(t).*

13. How many roots does *L(t)* have? Where are they, and what do they represent?

14. What do the graphs of *G(t)* and *L(t)* have in common? Why does this occur (in terms of the scenario)? Try to come up with more than one commonality.

15. How do the graphs of *G(t)* and *L(t)* differ? Why does this occur (in terms of the scenario)? Try to come up with more than one difference.

Extension:

On a separate sheet of paper create a graph and write an equation for *R(t), **the rate** at which KD is drinking Gatorade t seconds after he starts.* What do the roots of this function represent?

3.5: Clash of Clones

A new game on the App Store called ***Clash of Clones*** is getting really popular. In each level you have to go around defeating armies of clones of annoying pop-culture celebrities. Level One, for example, requires you to defeat 25 Drake clones before you pass the level. In Level Two, there are 35 Miley Cyrus clones to defeat. In each of the following levels there are ten more clones than there were in the previous level.

1) Create a sequence that matches the number of clones in each level of ***Clash of Clones***. Then, write a rule to match the sequence. How many clones will you have to defeat in the 100^{th} level? Who should the celebrity in this level be?

2) Create a quadratic function $C(x)$ to model the total number of clones you have defeated after completing x levels in ***Clash of Clones***. How many total clones will you have defeated at the end of 8 levels? After how many levels will you have defeated 300 clones?

3) You can reach "Clone Conqueror Status" after you have defeated the 700^{th} clone. After which level does this occur?