MATH 313
EXAM 1

Name Key

Follow all directions. Use complete sentences for explanations.

1. (6 points) Determine if the quantities are related to one another. If so explain whether the value of the second quantity increases or decreases as the first quantity increases. If they are not related give a counter example or explanation.
   a. The number of minutes spent swimming and the number of calories you burn.

   related – # of calories increases as # of minutes swimming increases

   b. The age and reading level of students in your first grade classroom.

   not related – a younger student might be better reader

2. (4 points) For the two quantities listed, write two sentences explaining how the quantities are related. One sentence should show an increasing relationship, the other a decreasing relationship.
   The amount of Halloween candy and the amount of kids coming to your door.

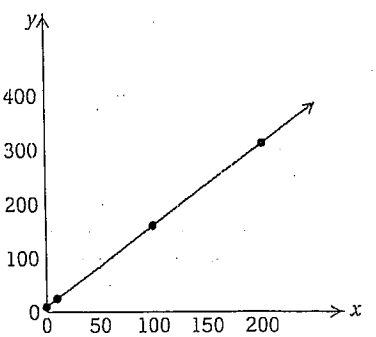
   Sentence 1: The amount of candy you have decreases as kids increase

   Sentence 2: The amount of candy given out increases as kids increase

3. (4 points) Compute the slope of the line.

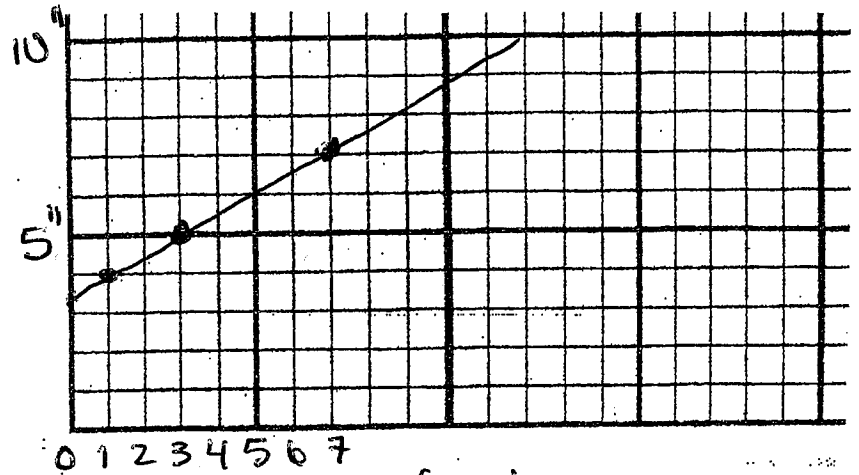
Slope = $3/2 = 1.5$

$$\frac{300-0}{200-0} = \frac{3}{2}$$



4. (15 points) Juan bought a tomato plant. Three days later, he measured the plant and it was 5 inches tall and a week later it was 7 inches tall.

   a. Draw a sketch of the growth rate of the plant. Use an appropriate scale on both axes.



weight

3

   b. Find the slope of the line. What does the slope tell you about the situation?

2

$$\frac{7-5}{7-3} = \frac{2}{4} = \frac{1}{2}\text{" per day growth}$$

2/7

   c. Fill in the table of values below with the corresponding amounts.

5

Number of days (D)	Height (H)
0	3½"
1	4"
5	6"
8	7½"
20	13½

4 1/7"
4 3/7"
6
12
9 6/7"

   d. If H is the height of the plant and D is number of day since he purchased the plant, write an equation relating the quantities.

3

$$H = \frac{1}{2}t + 3\frac{1}{2}$$

   e. How many days had the plant been growing when Juan purchased it?

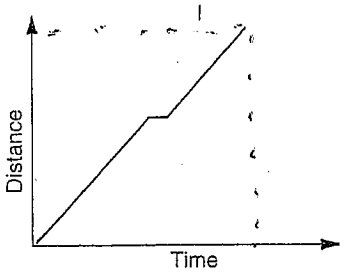
2

$$(3\frac{1}{2})(2) = 7 \text{ days}$$

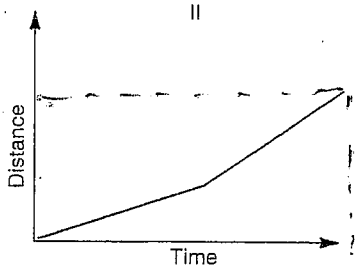
(14 days)

5. (11 points) Sally, Tom and Bette have jobs on the weekend at the supermarket. The graphs show their distances traveled from home to work on a given day as functions of time. Tom walked halfway and then jogged the rest of the way. Sally jogged halfway and then walked the rest of the way. Bette rollerbladed all the way, but stopped to enjoy the view for a few minutes along the way.

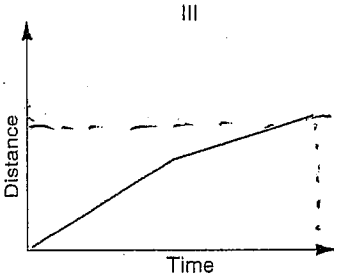
Bette



Tom



Sally



a. Which graph belongs to Sally? III

b. Which graph belongs to Tom? II

c. Which graph belongs to Bette? I

d. Who took the longest to get to work? Tom

e. How do you know? Explain using a complete sentence.
longest on time axis

f. Who took the least time to get to work? Bette

g. How do you know? Explain using a complete sentence.
Shortest on time axis

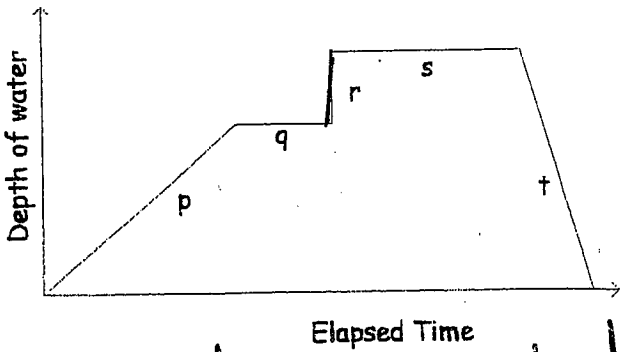
h. Who lives the farthest from work? Bette

i. How do you know? Explain using a complete sentence.
tallest on distance axis

j. Who lives the closest to work? Sally

k. How do you know? Explain using a complete sentence.
shortest on distance axis

6. (10 points) Write a sentence for each segment of the graph to describe what Melanie might be doing as she prepares for and then takes a bath.



Segment p: ran water into tub

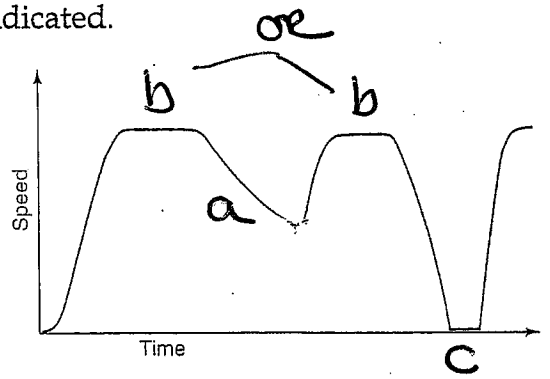
Segment q: turned off water

Segment r: got into tub

Segment s: sat in tub

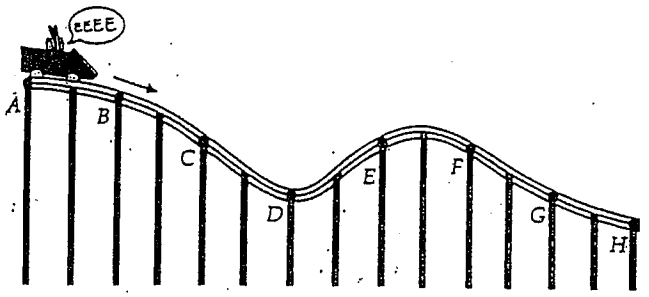
Segment t: opened drain / let out water

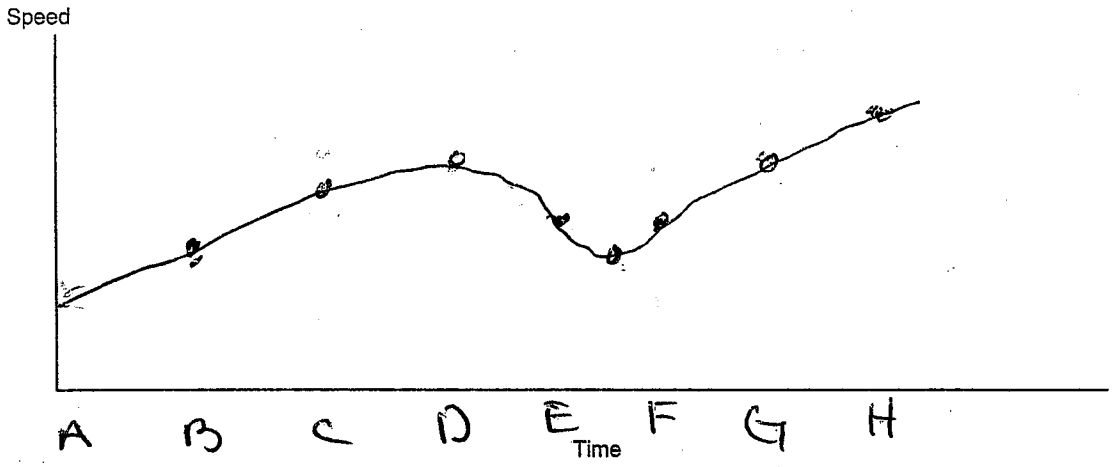
7. (6 points) The graph shown represents the speed of a biker over time. Label the graph as indicated.



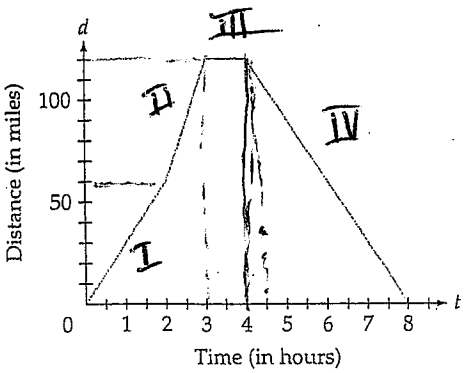
a. Which part of the graph shows where the biker pedaled up a hill? Mark it on the graph.
b. Which part of the graph shows the biker riding at a constant speed? Mark it on the graph.
c. Which part of the graph shows the biker stopped for a few minutes to repair a tire? Mark it on the graph.

8. (8 points) A roller-coaster moves from left to right along the course shown. Make a sketch of speed versus time. Use the letters A – H in you sketch.





9. (10 points) Given the following graph of a car trip, write a story that can be described by the graph. Include the appropriate distance and speed of the car for each segment of the trip.



I) car drove @ 30 mph for 2 hours

II) Then drove @ 60 mph for 1 hour

III) stopped for 1 hr

IV) Drove back 120 miles in 4 hrs (at 30 mph)

10. (12 points) Wiley Coyote leaves his cave walking at a constant speed of 10 ft/s for 12 seconds. Then he sees the roadrunner and runs at a constant speed of 15 ft/s for 8 more seconds. The roadrunner gets away, so Wiley decides to go back to his cave and build a trap instead. He walks home at a constant 5 ft/s.

    a. How far away from home is he when Wiley Coyote decides to go back to the cave? $10(12) + 15(8)$

    $120 + 120 = 240$

    b. How long does it take Wiley Coyote to get back to the cave one he decides to build the trap?

    $240 \div 5 = 48$ sec

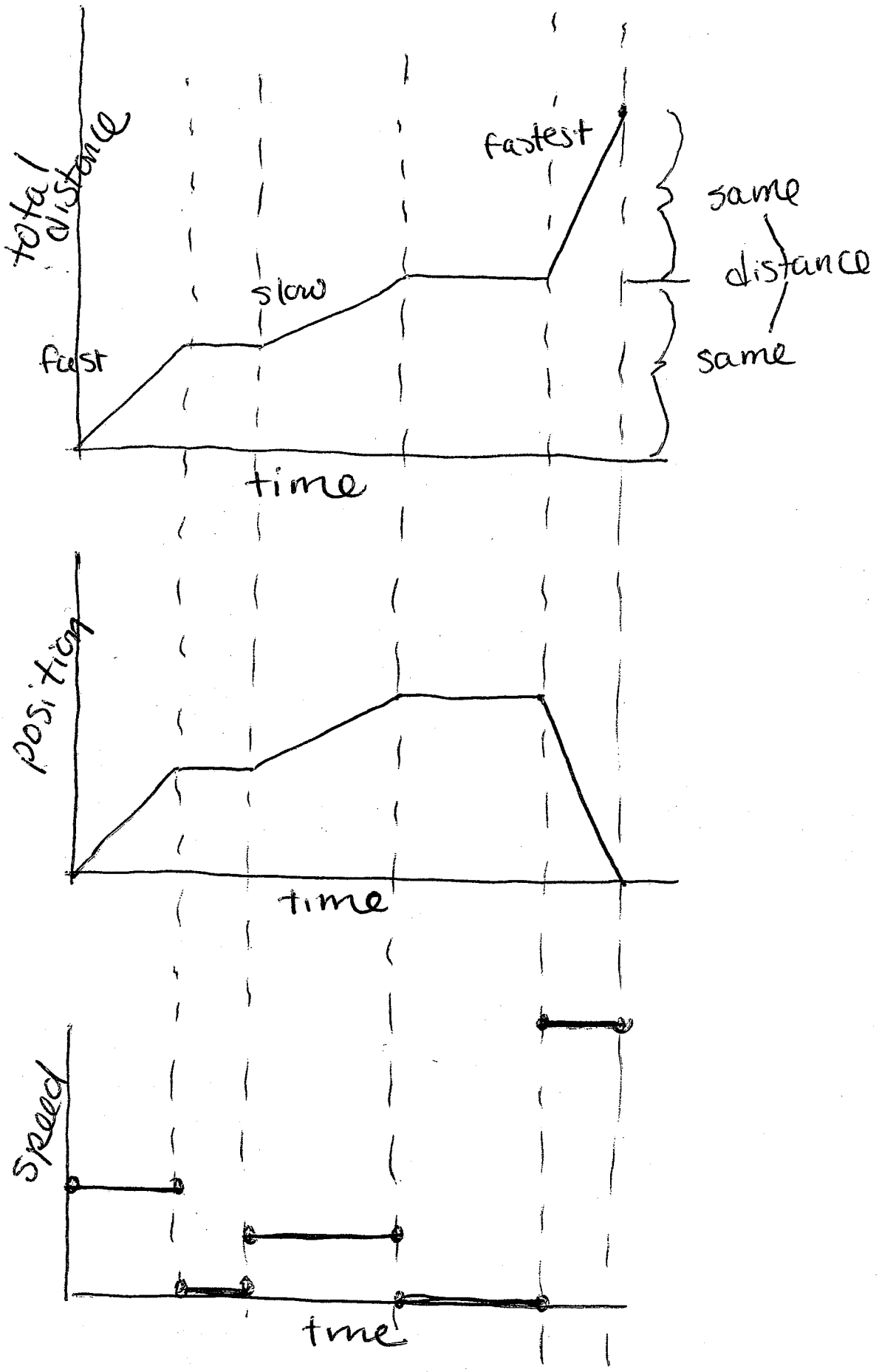
    c. Write an algebraic expression for Wiley's distance from the cave starting from the point where he decides to return to the cave.

    $D = 240 - 5t$

11. (15 points) Sponge Bob Square Pants woke up late for work. He ran out the door and jogged to the Crusty Crab Restaurant. He started to work, but burned the crab cakes and Mr. Crab got mad at him and sent him away. Patrick did not want to go home, so he decided to walk slowly to Patrick Star's house, farther away from his house. He stayed there for a while blowing bubbles, but then remembered that he forgot to feed his pet Gary, and sprinted very quickly home.

    ON THE ATTACHED PIECE OF GRAPH PAPER, CREATE THREE GRAPHS FOR THIS SITUATION. USE THE SAME SHEET OF PAPER, AND GRAPH THE THREE GRAPHS LISTED VERTICALLY (ABOVE/BELOW EACH OTHER). USE THE SAME TIME LINE ALONG THE HORIZONTAL AXIS FOR ALL THREE GRAPHS. THE GRAPHS CAN BE IN ANY ORDER, BUT MUST BE LABELED.

    a. Create a graph of Sponge Bob's total distance traveled over time.
    b. Create a graph of Sponge Bob's position / distance from home over time.
    c. Create a graph of Sponge Bob's speed over time.


total distance
fastest
same
distance
slow
fast
same
time
position
time
Speed
time