

WORKSHEET #3

Math 6A20, Fall 2020

Name: Jaqueline M

Group Name: 1

Instructions. You are encouraged to work with (not copy) your group, but each of you will turn in your own worksheet by the end of the day (11:59 pm) via Gradescope. You may ask the TA a few questions, which the TA will answer with leading questions (not answers) to help guide you.

Log in to www.Gradescope.com with your UCRNetID@ucr.edu email to submit your worksheet.

Instructions for clear submissions. If you can, write on the worksheet. If you cannot, then write your solutions to page 1 of the worksheet on one paper and your solutions to page 2 of the worksheet on a second paper, clearly labeling each question. Scan your work with a scanner or (free) scanning app to pdf and upload it to Gradescope. Your submission should be clear, easy to read, no shadows with each of your pages submitted to the correct page on Gradescope. If it is not, then resubmit. There is a 2 point penalty for unclear submissions. This worksheet is 15 points.

Question 1 (6 points) At 5 pm, Julie leaves home to go to the food store, Foodie, which is 4 miles from home. She walks in a straight line from home to Foodie and at a constant speed.

(a). (1 point) At 5:20 pm, Julie is 1.1 miles from home, how far is she from Foodie? Depict by drawing a picture of her path from home to Foodie and label with her distances from each at 5:20pm.

4 miles to foodie She is 2.9 miles away from Foodie at 5:20pm.
 $4 - 1.1 = 2.9$

(b). (1 point) At 5:40 pm, how far is Julie from home? How far is Julie from Foodie? Depict.

20 minutes
1.1 miles

5:00 → 5:20 → 1.1 miles
 5:20 → 5:40 → 2.2 miles

Julie is 2.2 miles from home at 5:40pm &
 1.8 miles away from Foodie.

(c). (1 point) Let t be the number of minutes since 5 pm. Let h be the number of miles Julie is away from home. If $\Delta t = 20$, what is Δh ? If $\Delta t = 40$, what is Δh ?

$\Delta t = 20 \quad \Delta h = 1.1$
 $\Delta t = 40 \quad \Delta h = 2.2$

(d). (1 point) How fast is Julie walking? Include units.

$\frac{2.2 - 1.1}{40 - 20} \rightarrow \frac{1.1}{20} \rightarrow 0.055 \text{ miles/minute}$

(e). (1 point) Describe verbally the meaning of the expression $4 - h$ in this context. Be precise.

4 is the miles her house is from Foodie & h represents the miles she is away from her home. The subtraction sign is there b/c the more she walks to foodie the less miles she is farther from it.

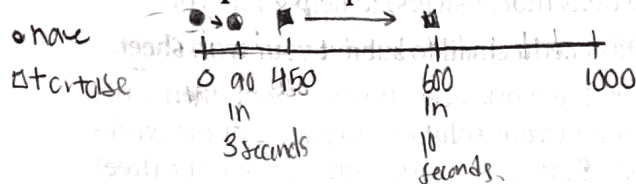
(f). (1 point) Write an equation for h in terms of t .

$h = 0.055t$
 $h = -t$

↳ constant

Question 2 (9 points) A tortoise and hare compete in a 1000-yard race. The fast hare starts at the starting line and gives the tortoise a 450-yard head start. When the starting gun is fired the hare and tortoise begin running at constant speeds. The hare reaches the 90 yard-mark in 3 seconds. The tortoise crawls to the 600 yard-mark in 10 seconds. Let T be the tortoise's distance and H the hare's distance from the starting line, in meters, s seconds since the race began.

(a). (1 point) Depict the race on a numberline. Label the starting places, end, and 3 distances.



(b). (1 point) How far does the hare run in: 6 seconds? in 1 second? Include units.

90 yards \rightarrow 3 seconds \rightarrow constant speed
 $\frac{90}{3} \rightarrow 30$ yards/s
 in 6 seconds the hare runs 180 yards in 6 seconds & in 1 second he runs 30 yards.

(c). (2 points) What is the tortoise's speed? How far from the starting line is the tortoise 1 second after the race began? Include units.

600 yard \rightarrow 10 seconds $\frac{600}{10} \rightarrow 60$ yards/s
 450 head start
 $60 \times 1 = 60$
 in one second the tortoise is 60 yards b/c of the 450 yard head start.

(d). (1 point) Write an equation for H in terms of s .

$$H = 1000 - 30s$$

\rightarrow constant rate
 \rightarrow starting line

(e). (1 point) Write an equation for T in terms of s .

$$T = 550 - 15s$$

\rightarrow constant rate
 \rightarrow starting line - 450 yard headstart

(f). (1 point) (no partial credit) For each box, check the box if the quantities are proportional.

☒ H, s ☒ $\Delta H, \Delta s$ ☐ T, s ☒ $\Delta T, \Delta s$
 $H = 30s$ $\frac{90}{3} = 30$ $\frac{15}{1} = 15$

(g). (2 points) Who finishes the race first? Justify completely.

$$H = 1000 - 30s$$

$$\begin{array}{r} -1000 \\ -30 \end{array} = \frac{-30s}{-30}$$

$$33.33\bar{3}$$

$$T = 550 - 15s$$

$$\begin{array}{r} -550 \\ -15 \end{array}$$

$$36.66\bar{6}$$

The hare finishes first b/c when you solve the equations we see that the hare finished in 33.33 seconds while the tortoise finished in 36.66 despite the headstart.