Math 2B Worksheet: 5.1 Areas and Distances

Write your names and Student ID numbers at the top of the page

1. Consider the curve $y = x^2$ on the interval $[1, 3]$

   (a) Is y increasing or decreasing?

   (b) Estimate the area under y on $[1, 3]$ using left endpoints and 4 rectangles. Is your estimate an under-estimate or an over-estimate?

   (c) Repeat part (b) using right endpoints. Is this an under-estimate or an over-estimate?

   (d) If a function f is increasing on $[a, b]$, then based upon your answers above, choose "Over" or "Under" in each part below.

      i. Estimating the area under f using left endpoints will result in an (Over/Under) estimate.

      ii. Estimating the area under f using right endpoints will result in an (Over/Under) estimate

(e) What do you think will happen when estimating the area under the curve of a function g that is ***decreasing*** on $[a, b]$? Test this by estimating the area under $g(x) = 6 - x^2$ on $[0, 2]$ using both left and right endpoints and 4 rectangles.

2. The speed of a runner increased steadily during the first three seconds of a race. Her speed at half-second intervals is given in the table. Find lower and upper estimates for the distance that she traveled during these three seconds.

t (s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0
v (ft/s)	0	6.2	10.8	14.9	18.1	19.4	20.2