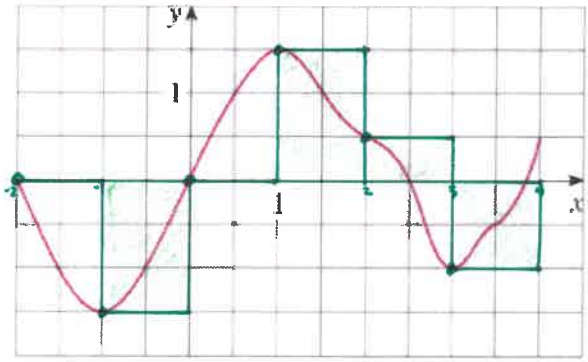
Math 252 Homework 3 Written Part **Name:** KEY 13/13

Write legibly. Show your work. Graph neatly. Use a ruler for all straight lines.

(1) By reading values from the given graph of g(x), use six rectangles to estimate $\int_{-2}^{4} g(x)\,dx$. In each case, carefully draw and shade the rectangles that you use. (Pay attention to the scale on the graph!)

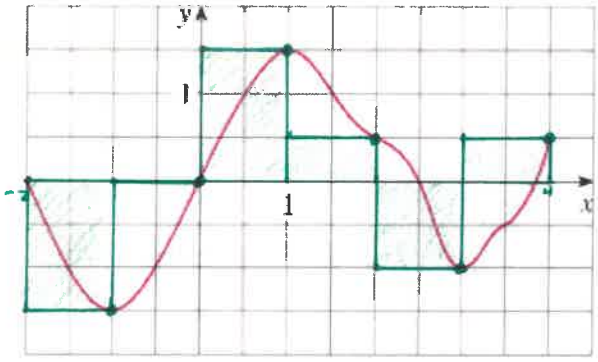
a. Left endpoints:



$L_6 = 1(0 + -1.5 + 0 + 1.5 + 0.5 + -1)$

$L_6 = -0.5$

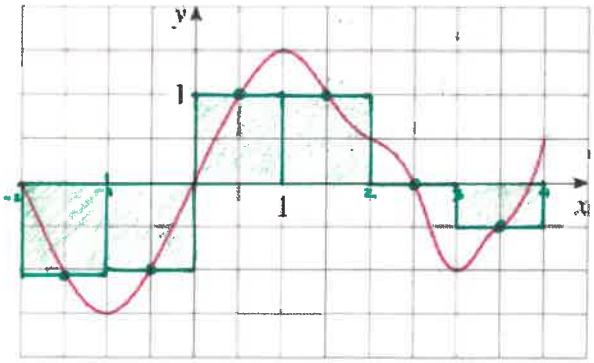
b. Right endpoints:



$R_6 = 1(-1.5 + 0 + 1.5 + 0.5 + -1 + 0.5)$

$R_6 = 0$

c. Midpoints:



$M_6 = 1(-1.1 + -1 + 1 + 1 + 0 + -0.5)$

$M_6 = -0.6$

Most people say -0.5, bcs read 1st rectangle as -1.

(2) A table of values for an increasing function f is shown. Use the table to find lower and upper estimates for $\int_{10}^{30} f(x)\,dx$. Use five subintervals.

x	10	14	18	22	26	30
$f(x)$	−12	−6	−2	1	3	8

a. Lower estimate: (Bcs fn is increasing, lower est = L_5)

$L_5 = 4(-12 + -6 + -2 + 1 + 3)$

$L_5 = -64$

b. Upper estimate: (R_5)

$R_5 = 4(-6 + -2 + 1 + 3 + 8)$

$R_5 = -16$

(3) Use a calculator or computer to make a table of values of midpoint Riemann sums (M_n) for the integral $\int_0^{\pi} \sin(x)\,dx$. (Don't round your answers.) Make sure you're in radians!

n	M_n
5	2.033281477…
10	2.008248408…
50	2.000329025…
100	2.000082249…

(4) What number does the integral $\int_0^{\pi} \sin(x)\,dx$ look like it's going to be?

$\int_0^{\pi} \sin(x)\,dx =$ 2