

November 8

What is the best thing to happen at TJ so far this year?

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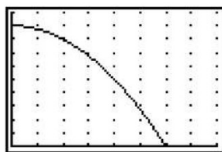
Students will verbally explain how to estimate the area under a curve using RAM

(using the words: right, left, midpoint, area, bounds, exact, approximation...)

1. Let  $f(x) = 9 - x^2$  on  $[0,3]$

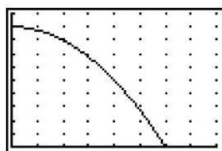
- a) If all intervals are the same width are there are six rectangles, what is the value of  $\Delta x_i$ ? \_\_\_\_\_. Use this value to compute the following.

$L_6 =$



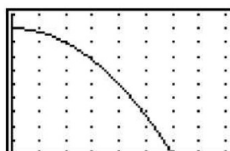
Interval	x-value	y-value/height	Width	area

$R_6 =$



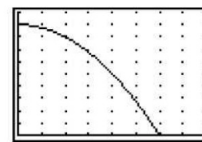
Interval	x-value	y-value/height	Width	area

$M_6 =$



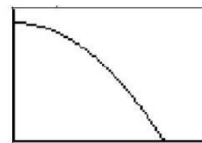
Interval	x-value	y-value/height	Width	area

- b) Suppose  $\Delta x_i$  has width equal 0.5. Chose a random value for  $x_i$  in each interval and compute the area of each Riemann rectangle. Find the total of the rectangles.



Interval	x-value	y-value/height	Width	area
0→.5	.4			
.5→1	.6			
1→1.5	1.0001			

- c) Choose six randomly sized intervals and choose a point at random in each interval. Compute the area of the Riemann rectangle and find the total area.



Interval	x-value	y-value/height	Width	area
0→2				
2→2.1				
2.1→2.5				

2. Let  $f(x) = 3^x$  on  $[-1,3]$

- a) Find  $L_8 =$ ,  $R_8 =$ ,  $M_8 =$   
b) Suppose  $\Delta x_i$  has width equal 0.5. Chose a random value for  $x_i$  in each interval and compute the area of each Riemann rectangle. Find the total area approximated by the rectangles.  
c) Choose eight randomly sized intervals and choose a point at random in each interval. Compute the area of the Riemann rectangle and find the total area approximated by the rectangles.

### Interpretation of Area

1. A car comes to a stop 5 seconds after the driver slams on the brakes. While the brakes are on, the following velocities are recorded. Estimate the total distance the car took to stop. **LRAM**

Time since brakes applied (sec)	0	1	2	3	4	5
Velocity (ft/sec)	88	60	40	25	10	0

2. You jump out of an airplane. Before your parachute opens, you fall faster and faster. Your acceleration decreases as you fall because of air resistance. The table below gives your acceleration  $a$  (in  $\text{m/sec}^2$ ) after  $t$  seconds. Estimate the velocity after 5 seconds. **RRAM**

$t$	0	1	2	3	4	5
$a$	9.81	8.03	6.53	5.38	4.41	3.61

3. Cedarbrook golf course is constructing a new green. To estimate the area  $A$  of the green, the caretaker draws parallel lines 10 feet apart and then measures the width of the green along that line. Determine how many square feet of grass sod that must be purchased to cover the green if

- The caretaker is lazy and uses midpoint rectangles to calculate the area.
- The caretaker uses left rectangles to calculate the area.
- The caretaker uses right rectangles to calculate the area.
- ~~The caretaker uses trapezoids to calculate the area.~~

Width in feet	0	28	50	62	60	55	51	30	3
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