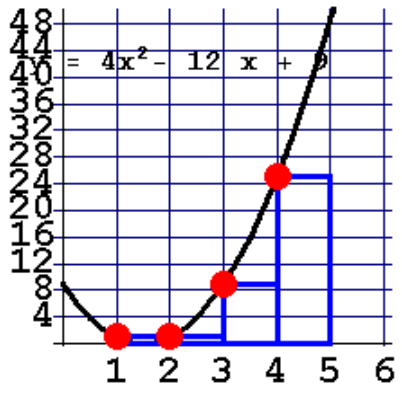
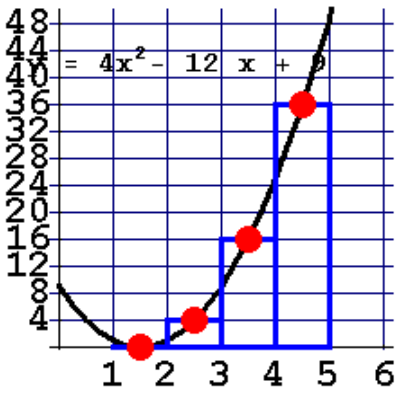
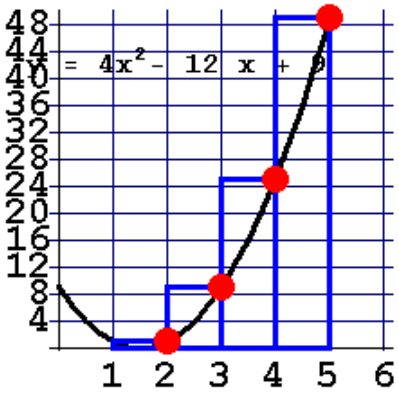
5.1 Approximating the area underneath a curve

1. Approximate the area under the curve $f(x) = 4x^2 - 12x + 9$ on the interval $[1, 5]$. Use 4 equal subintervals, and the methods LRAM, MRAM, and RRAM.





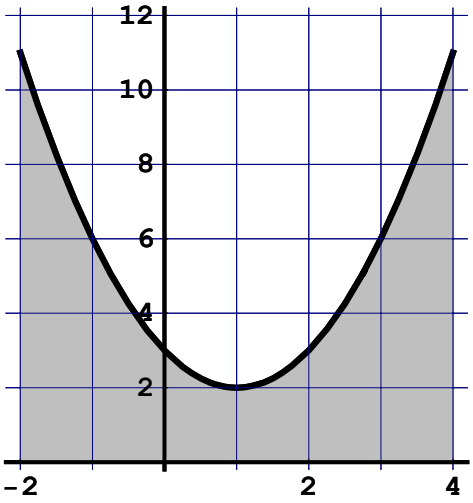


LRAM =

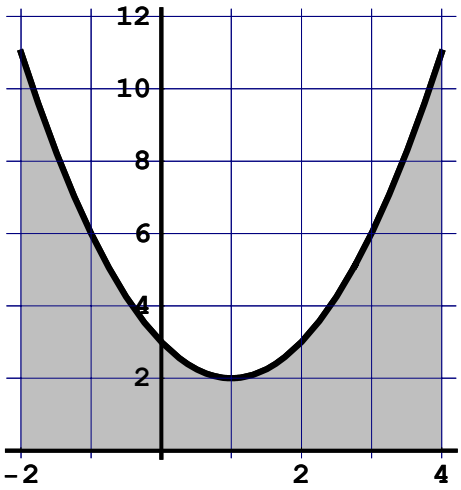
MRAM =

RRAM =

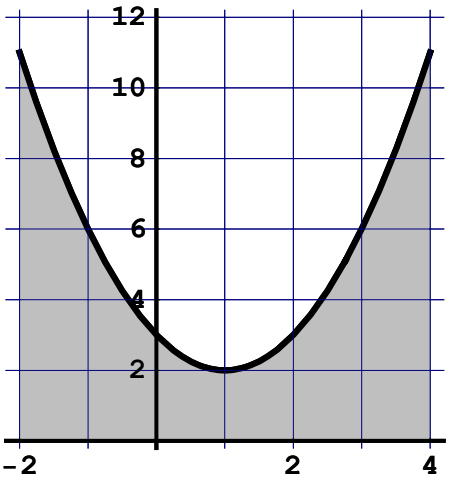
2. Approximate the area under the curve $f(x) = x^2 - 2x + 3$ on the interval $[-2, 4]$. Use 6 equal subintervals, and the methods LRAM, MRAM, and RRAM.



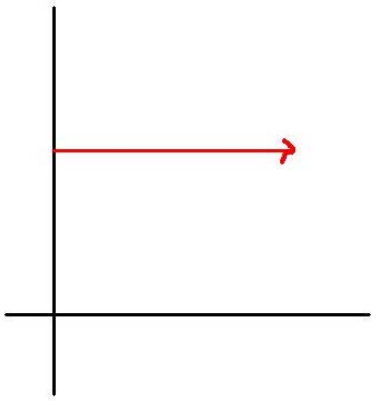
LRAM =

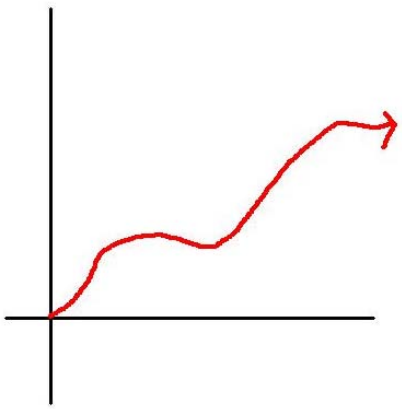


MRAM =



RRAM =

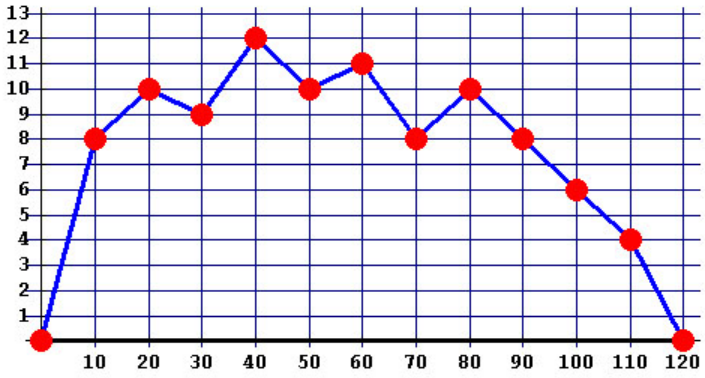




3. You decide you need some exercise, so you head out to Rancho San Antonio to get a run in. You only run for 2 minutes, but that's better than nothing, right? Below is a table of your velocity at 10 – second intervals. Use LRAM and RRAM to approximate how far you ran.

LRAM =

Time (sec)	Velocity (ft/sec)
0	0
10	8
20	10
30	9
40	12
50	10
60	11
70	8
80	10
90	8
100	6
110	4
120	0



4. You decide to take your car out for a long drive to San Francisco, over the Golden Gate, and back. Below is a table of your velocity at 20 minute intervals. Approximate how far you travelled using LRAM and RRAM.

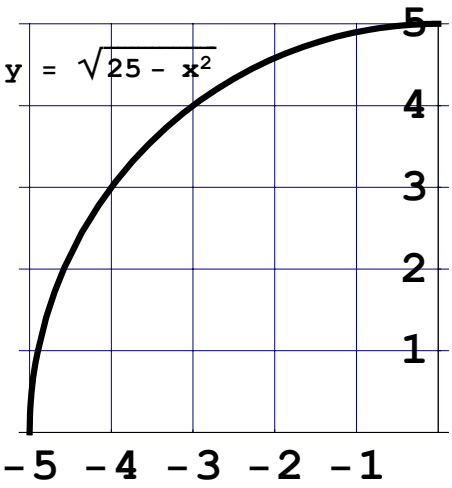
LRAM =

RRAM =

Time (mins)	Velocity (miles/hr)
0	0
20	60
40	56
60	62
80	58
100	60
120	64
140	55
160	60

5. Approximate the volume of a hemisphere with radius 5 feet by using $f(x) = \sqrt{25 - x^2}$ on the interval $[-5, 0]$. This will give us a quarter circle. Now, rotate the quarter circle around the x – axis, to obtain a hemisphere. Use 5 intervals with RRAM to approximate the volume.

RRAM =


y = √25 − x²
5
4
3
2
1
−5 −4 −3 −2 −1