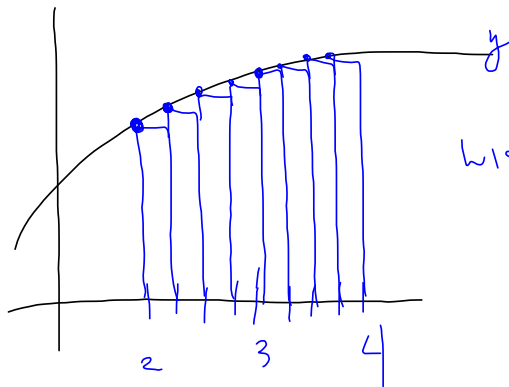


Function	Interval	8 left <u>rectangles</u>	8 right rectangles	8 midpoint rectangles	8 trapezoids
$y = 1 + x - \sqrt{x}$	$[2, 5]$				

(LR)



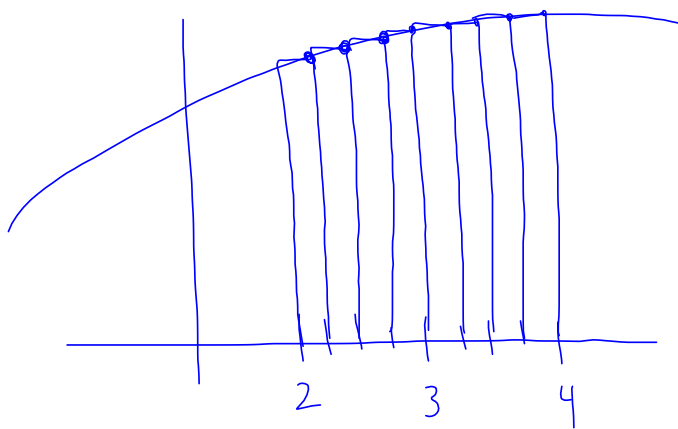
$$\text{width} = \frac{\Delta x}{n} = \frac{2}{8} = \frac{1}{4}$$

$$A_{LR} \approx \frac{1}{4} \left( f(2) + f(2.25) + f(2.5) + \dots + f(3.75) \right)$$

$$\approx 4.376$$

Function	Interval	8 left <u>rectangles</u>	8 right rectangles	8 midpoint rectangles	8 trapezoids
$y = 1 + x - \sqrt{x}$	$[2, 5]$				

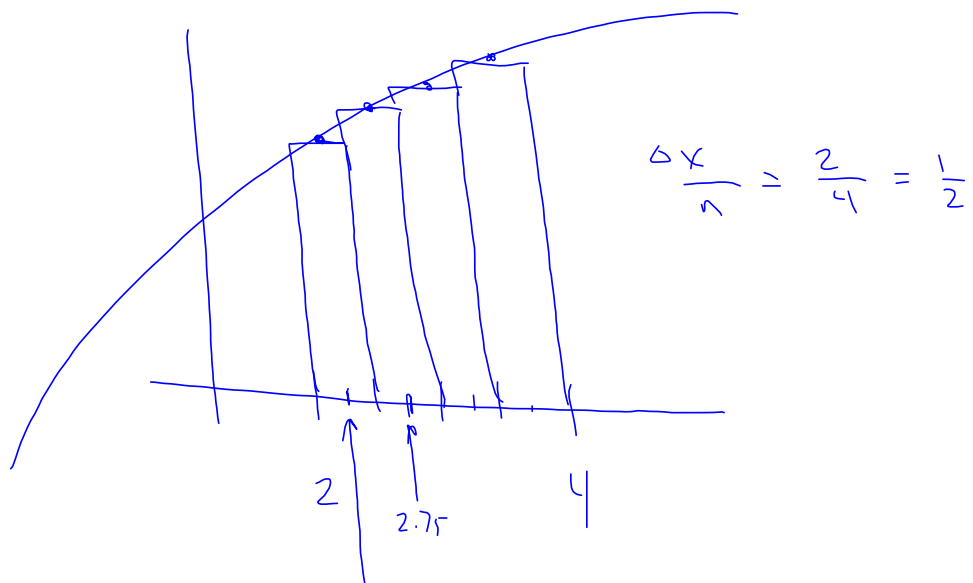
RR



$$A_{RR} \approx \frac{1}{4} \left( f(2.25) + f(2.5) + f(2.75) + \dots + f(4) \right)$$

$$= 4.730$$

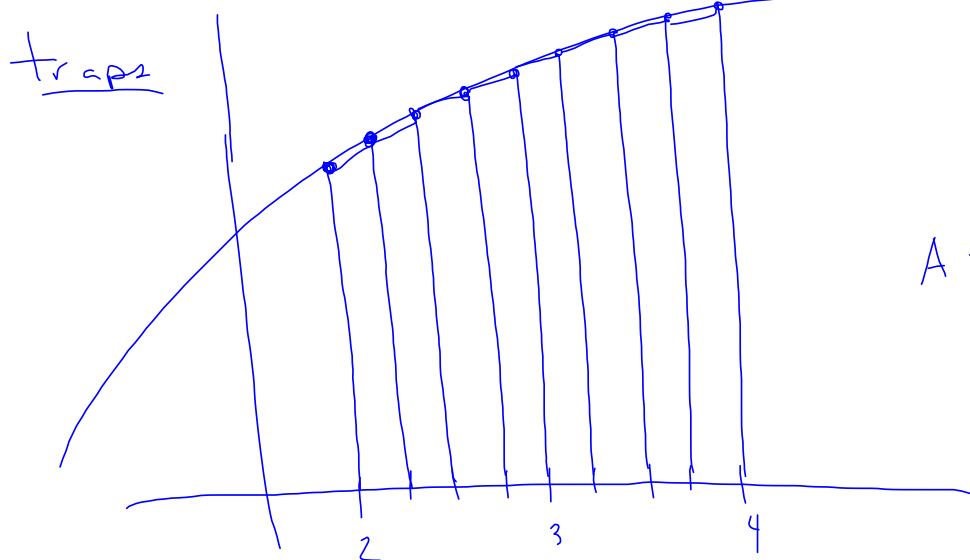
Function	Interval	8 left rectangles	8 right rectangles	8 midpoint rectangles	8 trapezoids
$y = 1 + x - \sqrt{x}$	$[2, 5]$				



$$A_{mp} \approx \frac{1}{2} \left( f(2.25) + f(2.75) + f(3.25) + f(3.75) \right)$$

$$= 4.551$$

Function	Interval	8 left <u>rectangles</u>	8 right rectangles	8 midpoint rectangles	8 trapezoids
$y = 1 + x - \sqrt{x}$	[2, 5]				



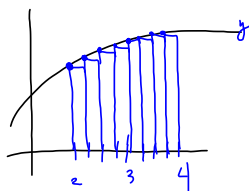
$$A = \frac{1}{2}(b_1 + b_2)h$$

$$\begin{aligned}
 A_{TR} &\approx \frac{1}{2} \cdot \frac{1}{4} \left( f(2) + \underbrace{f(2.25)}_1 + f(2.5) + f(2.75) + \dots \right) \\
 &\approx \frac{1}{2} \cdot \frac{1}{4} \left( f(2) + \underline{2f(2.25)} + \underline{2f(2.5)} + \dots + \underline{2f(3.75)} + f(4) \right) \\
 &= 4.553
 \end{aligned}$$

Function	Interval	8 left rectangles	8 right rectangles	8 midpoint rectangles	8 trapezoids
$y = 1 + x - \sqrt{x}$	$[2, 5]$				

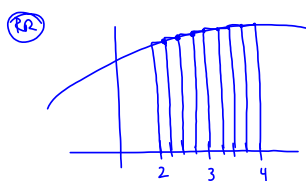
The actual area under the curve is:  $\frac{4}{3}(2 + \sqrt{2}) \approx 4.55228475$

LR



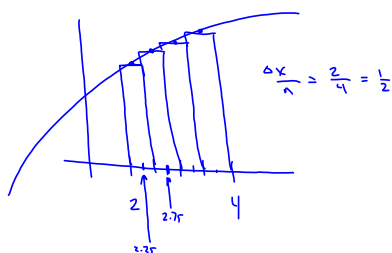
4.376

RR



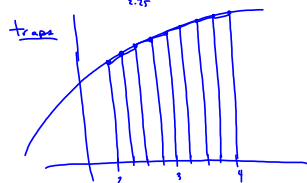
4.730

MP



4.551

TRAP



4.553

2. Using the following chart of the values of  $f(x)$ , find the area beneath the curve of  $f(x)$  on the interval  $[3.5, 4.7]$ . (3 decimal place accuracy).

x	3.5	3.8	4.1	4.4	4.7
f(x)	12.8	19.6	2.0	14.1	3.0

$$\begin{aligned}
 A_{\text{Trapezoid}} &\approx \frac{1}{2} \cdot (0.3) \left( f(3.5) + \underline{2}f(3.8) + \underline{2}f(4.1) + \right. \\
 &\quad \left. + \underline{2}f(4.4) + f(4.7) \right) \\
 &\approx \frac{1}{2} \cdot (.3) \left( 12.8 + \underline{2}(19.6) + \underline{2}(2.0) + \underline{2}(14.1) + 3 \right)
 \end{aligned}$$

3. I am in a car and travel for 20 minutes. Below are the speeds in mph recorded every two minutes. Use the trapezoid rule to estimate the distance I travel using trapezoids. (3 decimal place accuracy).

Time	0	2	4	6	8	10	12	14	16	18	20
Speed	20	22	35	46	50	50	20	0	10	20	34

$$\text{Distance} \approx \frac{1}{2} \cdot \frac{2}{60} \left( 20 + 2(22) + 2(35) + \dots + 2(10) + 2(20) + 34 \right)$$

$$= \frac{560}{60}$$

$$= 9.\bar{3}$$

He travels approx.  $9\frac{1}{3}$  miles in 20 min.