

**TRAPEZOIDAL RULE**

Directions: Approximate the area under the curve over the given interval using 5 trapezoids.

1.)  $y = -x^2 - 2x + 9$

$[-3, 2]$

$n = 5$

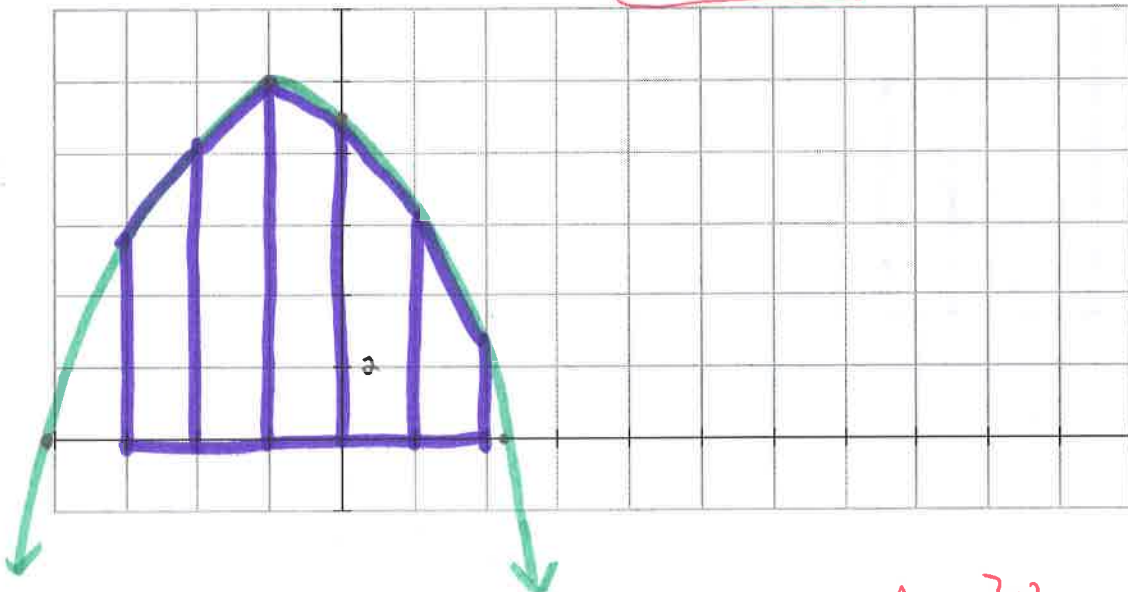
$\Delta x = \frac{2 - (-3)}{5} = 1$

X	-3	-2	-1	0	1	2
f(x)	6	9	10	9	6	1

$T_5 = \frac{1}{2} [6 + 2(9) + 2(10) + 2(9) + 2(6) + 1]$

$T_5 = \frac{1}{2} [75]$

$T_5 = \frac{75}{2} u^2$



2.)  $y = \frac{2}{x}$

$[2, 7]$

$n = 5$

$\Delta x = \frac{7 - 2}{5} = 1$

X	2	3	4	5	6	7
f(x)	1	2/3	1/2	2/5	1/3	2/7

$T_5 = \frac{1}{2} [1 + 2(\frac{2}{3}) + 2(\frac{1}{2}) + 2(\frac{2}{5}) + 2(\frac{1}{3}) + \frac{2}{7}]$

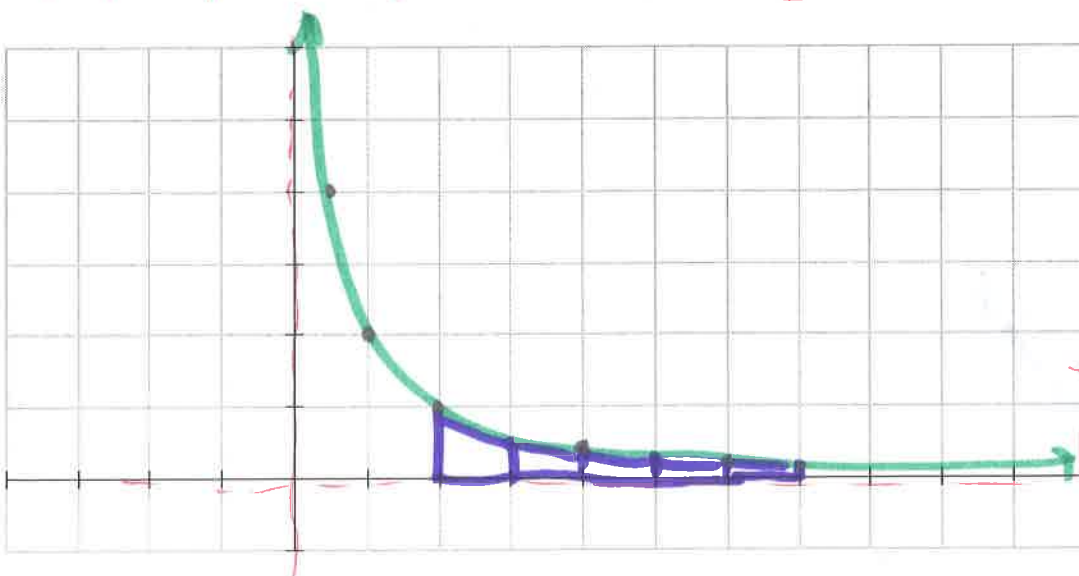
$T_5 = \frac{1}{2} [1 + \frac{4}{3} + 1 + \frac{4}{5} + \frac{2}{3} + \frac{2}{7}]$

$T_5 = \frac{1}{2} [4 + \frac{4}{5} + \frac{2}{7}]$

$T_5 = \frac{1}{2} [\frac{140}{35} + \frac{28}{35} + \frac{10}{35}]$

$T_5 = \frac{1}{2} [\frac{178}{35}]$

$T_5 = \frac{89}{35} u^2$



$$8 \frac{16}{3} - \frac{9}{2}$$

Directions: Approximate the area under the curve over the given interval using 3 trapezoids.

3.)  $y = -\frac{x^2}{2} + x + 5$

$[0, 3]$

$n = 3$

$\Delta x = \frac{3-0}{3} = 1$

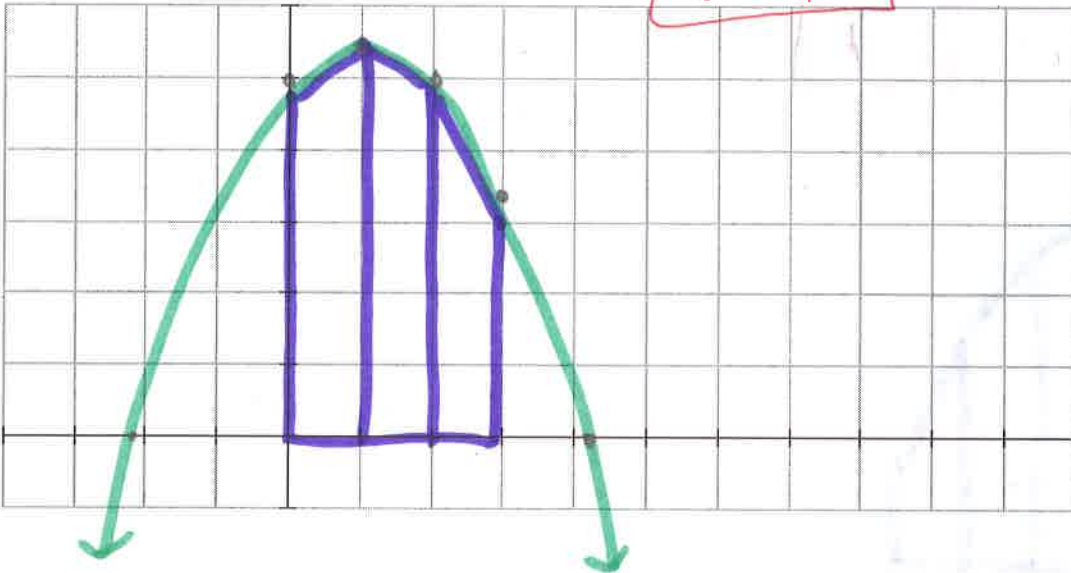
X	0	1	2	3
f(x)	5	5.5	5	3.5

$T_3 = \frac{1}{3} [5 + 2(5.5) + 2(5) + 3(5)]$

$T_3 = \frac{1}{3} [5 + 11 + 10 + 15]$

$T_3 = \frac{1}{3} [29.5] = \frac{1}{3} \left[ \frac{59}{2} \right]$

$T_3 = 59/40$



4.)  $y = \frac{x^2}{2} + x + 1$

$[-2, 1]$

$n = 3$

$\Delta x = \frac{1-(-2)}{3} = 1$

X	-2	-1	0	1
f(x)	1	1/2	1	2.5

$T_3 = \frac{1}{3} [1 + 2(1/2) + 2(1) + 2.5]$

$T_3 = \frac{1}{3} [1 + 1 + 2 + 2.5]$

$T_3 = \frac{1}{3} [6.5] = \frac{1}{3} \left[ \frac{13}{2} \right] = \frac{13}{4}$

