DATE: ____________________

Trapezoid Rule

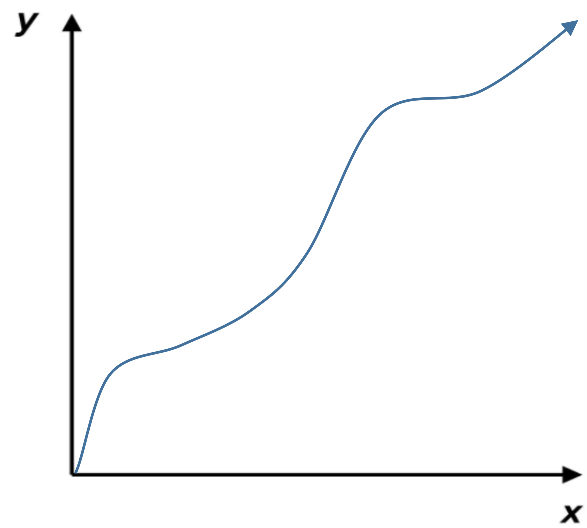
Recall Riemann Sums….

x	0	0.5	1.0	1.5	2.0
$f(x)$	3	4	5	8	13

A table of values for a continuous function f is shown above. If four equal subintervals of $[0, 2]$ are used, what is the right sum approximation of $\int_0^2 f(x)\,dx$?

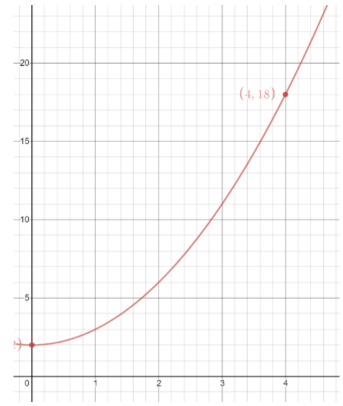
Trapezoid Sum (Trapezoid Rule)

Area of a Trapezoid: $\frac{1}{2}(b_1 + b_2)h$



Example 1:

Use a trapezoidal sum with 3 equal subintervals to estimate the area of the region bounded by $y = x^2 + 2$ and x-axis between $x = 1$ and $x = 4$.



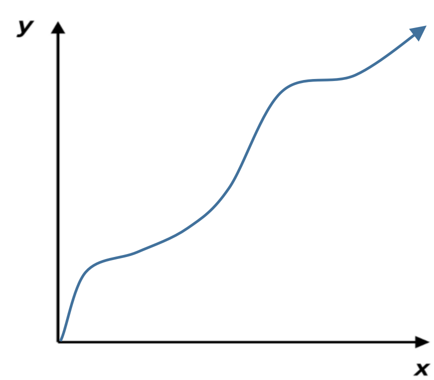
Example 2:

x	0	0.5	1.0	1.5	2.0
$f(x)$	3	4	5	8	13

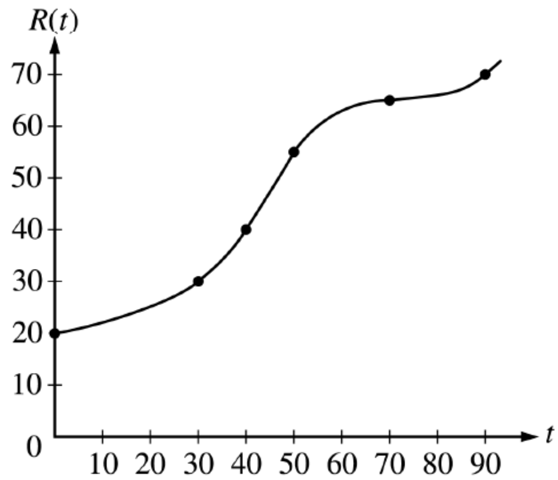
A table of values for a continuous function f is shown above. If four equal subintervals of $[0, 2]$ are used, what is the trapezoidal approximation of $\int_0^2 f(x)\,dx$?

What if the subintervals are not equal?

Trapezoid Sum (Unequal Subintervals)



Example 1:



t (minutes)	$R(t)$ (gallons per minute)
0	20
30	30
40	40
50	55
70	65
90	70

Approximate the value of $\int_0^{90} f(x)\,dx$ using a trapezoidal sum with the five subintervals indicated by the data in the table.

Example 2:

x	0	1	4	6	10
$f(x)$	3	5	2	-1	1

A table of values for a continuous function f is shown above. If four subintervals of $[0, 10]$ are used, what is the trapezoidal approximation of $\int_0^{10} f(x)\,dx$?