Trapezoid approximation for the area under a curve.

Remember Area of a trapezoid: $A = \frac{1}{2}(b_1 + b_2)h$

Last year we used

$$T = \frac{1}{2}\Delta x\left[f(x_0) + 2f(x_1) + 2f(x_2) + \cdots + 2f(x_{n-1}) + f(x_n)\right]$$

one of the first, one of the last and 2 of everything in between.

x	1	1.2	1.4	1.6	1.8	2
f(x)	3	4	8	7	10	12

$n = 5$

You could do individual trapezoids

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

$T_A = \frac{1}{2}(3+4)(.2) + \frac{1}{2}(4+8)(.2) + \frac{1}{2}(8+7)(.2) + \frac{1}{2}(7+10)(.2) + \frac{1}{2}(10+2)(.2)$

$T = \frac{1}{2}(.2)(3+4+4+8+8+7+7+10+10+2)$

or

$\frac{1}{2}(.2)(3+2(4)+2(8)+2(7)+2(10)+2) = 6.3$

So the Trapezoid approximation for the area under the curve ≈ 6.3

A) Approximate the integral using the trapezoidal Rule. B) find the max value of the $|f''(x)|$ on the interval $[a,b]$ f(x) is the integrand.

① $\int_1^3 \frac{1}{x}\,dx$ $n=6$

② $\int_0^1 \sin(x^2)\,dx$ $n=5$

③ $\int_0^1 e^{-x^2}\,dx$ $n=10$