Warm-Up

What does the following limit mean?

$$\lim_{n \to \infty} \sum_{i=1}^{n} \left(5\left(c_i\right)^2 - 2c_i + 7\right)\Delta x$$

What is the equation for the curve you are finding the area under?

5.2 Definite Integrals

Estimate the area under the graph $f(x) = \sqrt{4 - x^2}$

using various rectangular methods with n = 10, 50, 100, 500

What happens as n approaches infinity?

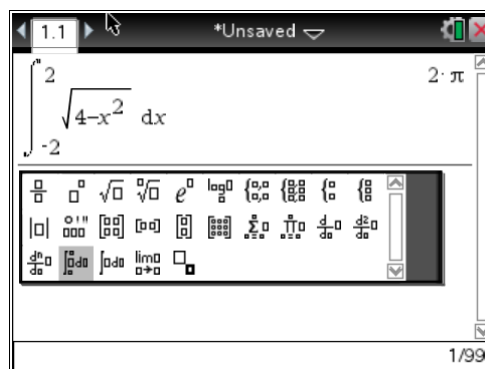definition of a definite integral as a limit of a Riemann Sum

upper limit   definite integral

$$\lim_{n\to\infty}\sum_{i=1}^{n} f(x_i)\Delta x =$$

variable of integration

lower limit   integrand

if a function is continuous on a given interval then the definite integral exists

$$\int_{-2}^{2}\sqrt{4-x^2}\ dx =$$

1.1 ▶	*Unsaved ▽	
		$2\cdot\pi$

$$\int_{-2}^{2}\sqrt{4-x^2}\ dx$$

1/99

Ex.   express the limit as a definite integral:

$$\lim_{n\to\infty}\sum_{i=1}^{n}\left(4\left(c_i\right)^3 - 3c_i + 2\right)\Delta x \qquad [1,6]$$

Definite Integrals on the Calculator

Nspire CAS/updated OS   others

$$\int_{-}^{-} \_\, dx$$ NINT(function,variable,lower,upper)

$$\int_{1}^{4} 5\, dx =$$

so $\int_{a}^{b} f(x)\, dx = \int_{a}^{b} c\, dx = c(b-a)$

$$\int_{-2}^{6} 7\, dx =$$

Definite Integrals and Signed Area

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┌ 1.1   1.2 ▶        *Unsaved ▽           ▢▯✕
│ ⌠2·π                                    -2  ▲
│ │   sin(x) dx                              ▯
│ ⌡ π
│ ▶|
│                                           ▽
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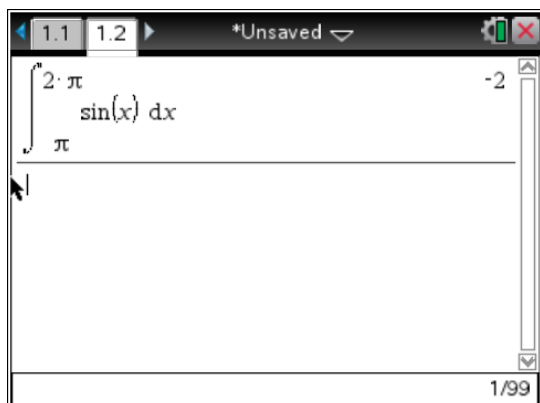
Why negative?

net area vs. total area

$$\int_a^b f(x)dx = \text{net area}$$

Find the total area bounded by $y = 4x - x^2$ on [0,6]

Use the graph of the integrand and areas to evaluate the integral.

$$\int_{1}^{2}\left(-2x+6\right)dx =$$