QUIZ #12: CALCULUS 1A (Stankova)
Wednesday, April 21, 2004
Section 10:00–11:00 (Voight)

Problem 1. *Express the limit as a definite integral on the given interval:*

$$\lim_{n\to\infty} \sum_{i=1}^{n} \left(e^{(x_i^*)^2} + x_i^* \sqrt{1 - x_i^*} \right) \Delta x, \qquad [1, 4].$$

SOLUTION. This is the midpoint formula for the integral

$$\lim_{n\to\infty} \sum_{i=1}^{n} f(x_i^*)\Delta x = \int_a^b f(x)\, dx.$$

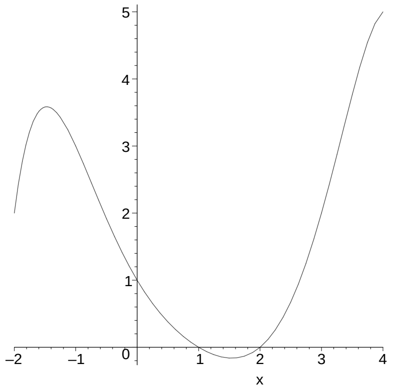
Therefore the limit is

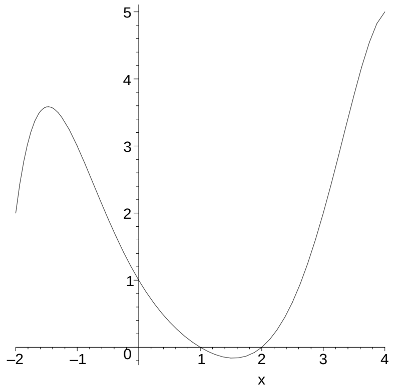
$$\int_1^4 \left(e^{x^2} + x\sqrt{1-x} \right) dx.$$

QUIZ #12: CALCULUS 1A (Stankova)
Wednesday, April 21, 2004
Section 11:00–12:00 (Voight)

Problem 1. *The graph of f is shown. Draw a picture and estimate $\int_{-2}^{4} g(x)\,dx$ with three subintervals using:*

(a) *left endpoints,* (b) *midpoints.*





Solution. We have the three intervals $[-2, 0], [0, 2], [2, 4]$, each of length $\Delta x = 2$. For left endpoints, we have the values

$$f(-2) = 2, \quad f(0) = 1, \quad f(2) = 0.$$

Therefore the estimate of the integral is

$$\sum_{i=1}^{3} f(x_i)\Delta x = (2 + 1 + 0)(2) = 6.$$

For midpoints, we have

$$f(-1) = 3, \quad f(1) = 0, \quad f(3) = 2$$

hence

$$\sum_{i=1}^{3} f(x_i^*)\Delta x = (3 + 0 + 2)(2) = 10.$$