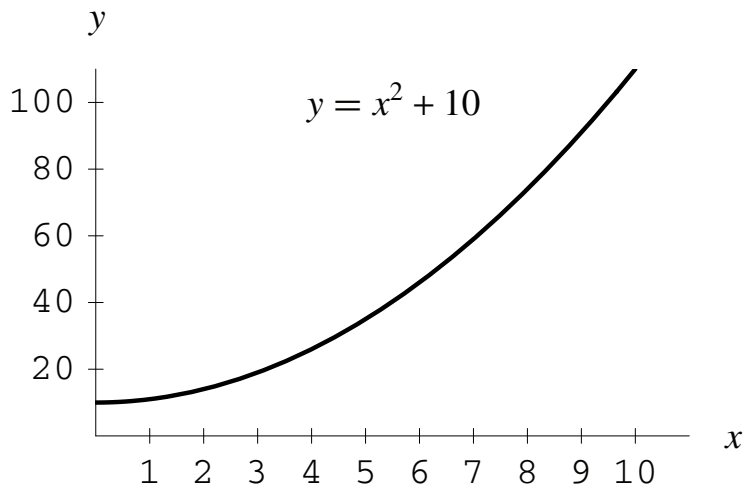
Some problems about definite integrals from Math 132 exams

1. Let $f(x) = x^2 + 10$.

   (a) Approximate the definite integral $\int_2^{10} f(x)\,dx$ by the Riemann sum that uses **4** subintervals and ***right*** endpoints as the sample points. Show the individual terms of the sum before you calculate the value of the sum.

   (b) On the graph below, draw the rectangles that correspond to the Riemann sum in (a).



2. Approximate $\int_0^2 \ln(1 + x^3 - x)\,dx$ in two ways:

   (a) By the Riemann sum with $n = 4$ subintervals and **left** endpoints.

   (b) By the Riemann sum with $n = 4$ subintervals and **midpoints**.

3. (a) Find the exact value of

$$\int_1^3 (1 + 2\,x)\,dx$$

   geometrically—by interpreting it as an area.

   (b) Approximate the same integral $\int_1^3 (1 + 2\,x)\,dx$ by a Riemann sum that uses **4** equal-length subintervals and ***right***-hand endpoints as the sample points. (Show the individual terms of the Riemann sum before you calculate the value of the sum.)

4. The continuous functions f and g have the properties:

$$\int_5^8 3\,g(x)\,dx = 12, \quad \int_5^8 \big[2\,f(x) + g(x)\big]\,dx = 12, \quad \int_0^5 f(x)\,dx = 3.$$

   Find the value of $\int_0^8 f(x)\,dx$.