Third Examination
Monday, April 12, 1999

Instructions: This exam should be done on your own paper. Your name should be on each sheet and on the back of the last sheet; the answers should appear written carefully and in order. If in doubt, show intermediate steps: Full credit may not be given, even for correct answers, unless work is arranged clearly. This exam is closed book. You may leave after handing in your exam paper, but be sure to check your answers carefully. Each entire problem is worth 25 points.

1. Compute

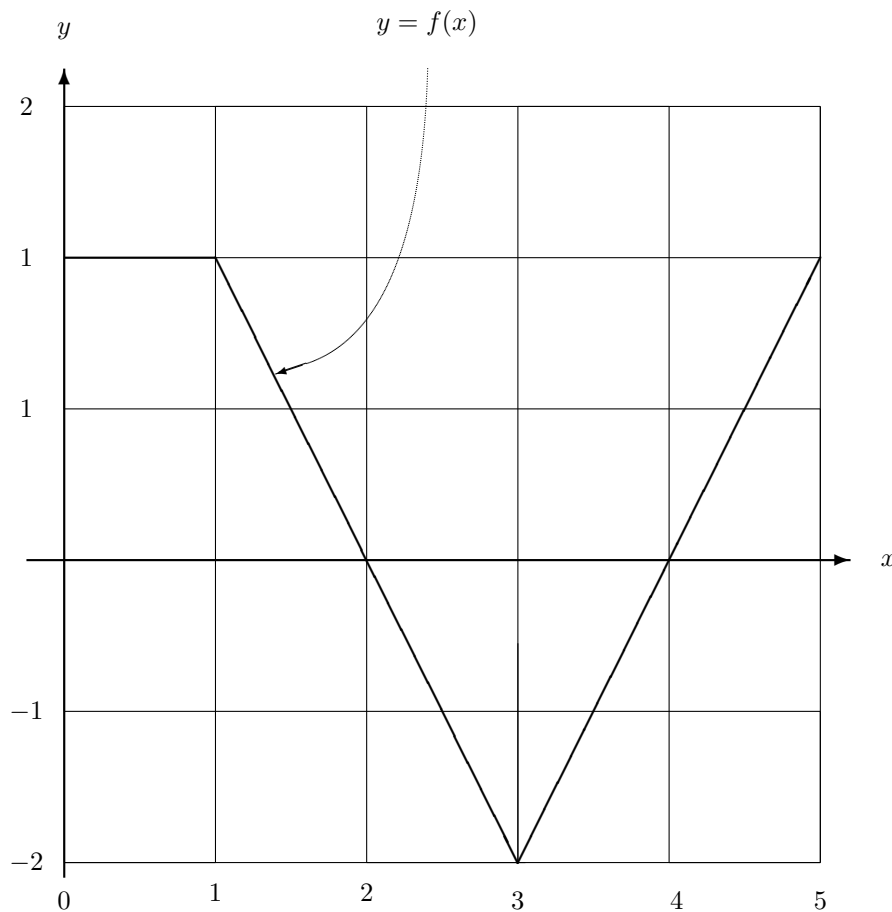$$\int_{x=0}^{5} f(x)dx,$$

   where $f(x)$ is as in Figure 1.

Figure 1: The figure for problem 1

2. The value V of a Tiffany lamp, worth $115 in 1965, increases at 18% per year. Its value in dollars t years after 1965 is given by

$$V = 115(1.18)^t.$$

Find the average value of the lamp over the period 1965–2000.

3. Use the fact that, if $f(x) = x^3/3$, then $f'(x) = x^2$, along with the fundamental theorem of calculus, to compute

$$\int_0^1 x^2 dx.$$

4. If $f(t)$ is measured in dollars per year and t is measured in years, what are the units of measurement for $\int_a^b f(t)dt$?