Name: _____ _____ / **25**

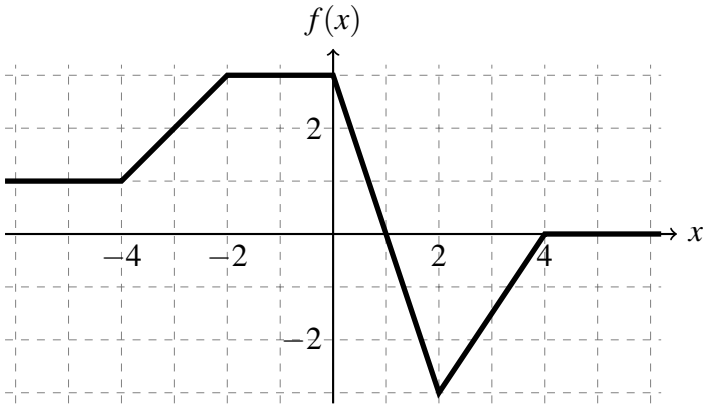
Circle one: **Rhodes (F01)** | **Bueler (F02)**

25 points possible. No aids (book, calculator, etc.) are permitted. Show all work and use proper notation for full credit.

1. [6 points] A particle is moving with the given acceleration $a(t)$ and other data. Find the position $s(t)$ of the particle.

$$a(t) = 2\cos t - 3\sin t, \quad s(0) = 0, \quad v(0) = 4$$

2. [6 points] The graph of f is shown. Evaluate each integral by interpreting it in terms of areas.

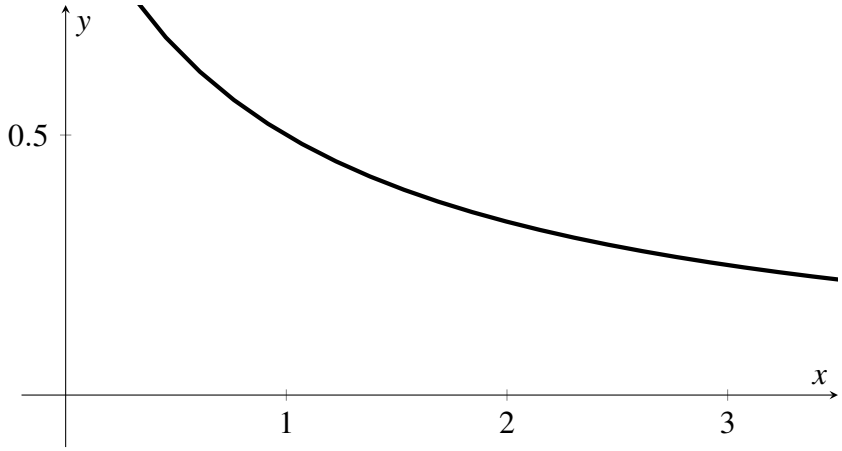


a. $\displaystyle\int_{-2}^{0} f(x)\,dx =$

b. $\displaystyle\int_{4}^{0} f(x)\,dx =$

c. $\displaystyle\int_{-2}^{4} f(x)\,dx =$

3. [8 points] Consider the graph of $f(x) = \dfrac{1}{1+x}$ below.



a. In the figure above, sketch four rectangles corresponding to the $n = 4$ Riemann sum on the interval $1 \leq x \leq 3$. Use right endpoints.

b. Compute the numerical value of the Riemann sum illustrated in part **a**. Express your answer as a single fraction.

c. Is your numerical value in part **b** an overestimate or an underestimate of $\displaystyle\int_1^3 \frac{1}{1+x}\,dx$?

4. [5 points] Use the Midpoint Rule with $n = 2$ subintervals to approximate the integral. Express your answer as a single fraction.

$$\int_0^4 x2^{-x}\,dx \approx$$