**1.*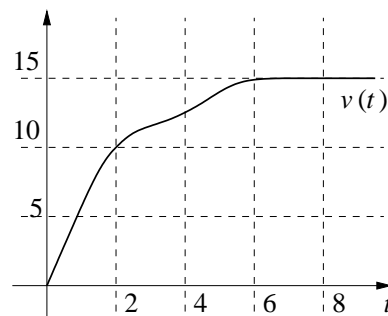* A calculus student is racing to get to the gateway lab to start taking the Entrance Gateway at the instant the doors open. The student's velocity, $v(t)$ (in m/s) is shown in the graph to the right for $0 \le t \le 8$ seconds. Write an integral that gives the distance the student travels in those 8 sec, and estimate this distance. (3 points)

2. Consider the integral $\int_0^{3\pi/2} 1 + \sin(x)\,dx$. Let LHS($n$) and RHS($n$) be, respectively, the left- and right-hand sums with n subdivisions approximating this integral. *By looking at a graph(—not by evaluating them)*, place in increasing order the following quantities: LHS(3), RHS(1), and $\int_0^{3\pi/2} 1 + \sin(x)\,dx$. (3 points)

3. Find each of the following derivatives (you need not simplify your answers). (4 points)
   a. $\frac{d}{dx}(3x\sin(x^2+1))$
   b. $\frac{d}{dt}\left(\frac{e^{2t}}{\ln(t)}\right)$