Name: ————————————————————————————   ———————— / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. **[5 points]** Find the derivatives.
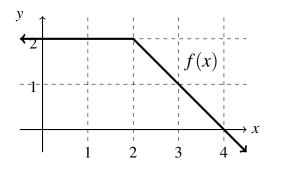
   a. $G(x) = \int_0^x \sqrt{1 + 2t^2}\, dt$

   b. $H(x) = \int_1^{x^3} 8\sin\left(\frac{1}{t}\right) dt$

2. **[6 points]** The velocity of a particle moving along a straight line is given by $v(t) = t^2 - 1$ where $0 \le t \le 2$ is measured in seconds and v is measured in meters per second.

   a. Find the **displacement** of the particle between $t = 0$ and $t = 2$.

   b. Find the **distance traveled** of the particle between $t = 0$ and $t = 2$.

   c. Does the problem contain sufficient information to determine the position of the particle at time $t = 2$? If so, determine the position. If not, explain why not.

3. [4 points] Use the graph of $f(x)$ (below) to answer questions about $A(x) = \int_0^x f(t)\,dt$.

a. $A(0) =$

b. $A(4) =$

c. At $x = 3$, is $A(x)$ increasing, decreasing, or neither?

4. [12 points] Evaluate the definite integrals below.

a. $\displaystyle\int_1^3 (2 - 6x^2)\,dx$

b. $\displaystyle\int_0^1 \sin(5x)\,dx$

c. $\displaystyle\int_0^2 \frac{x^2}{\sqrt{1+x^3}}\,dx$