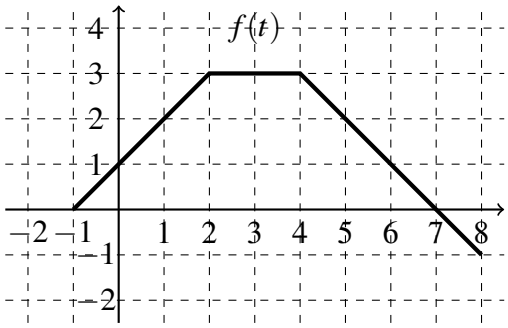
Name: _____ _____ **/ 25**

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

1. [4 points] Define $G(x) = \int_0^x f(t)\,dt$ where the graph of $f(t)$ is drawn below.



a. Determine $G(3)$.

b. Determine $G'(3)$.

c. On the interval $[-1, 8]$, does $G(x)$ have a maximum? If so, what is that maximum value? If not, explain why not.

2. [6 points] Use the Fundamental Theorem of Calculus (Part 1) to find each derivative.

a. $\dfrac{d}{dx}\left(\displaystyle\int_2^x (t^2 - 5)\,dt\right)$

b. $\dfrac{d}{dx}\left(\displaystyle\int_{x^2}^9 \frac{1}{\cos(t)}\,dt\right)$

3. [8 points] Evaluate each definite integral using the Fundamental Theorem of Calculus Part 2. Simplify your numerical answers here.

a. $\int_1^2 (2x - e^x)\,dx$

b. $\int_0^{\pi/2} (1 - \sin(x))\,dx$

4. [6 points] The function $f(t)$ measures the rate of water usage in a household over a 24 hour period where f is measured in gallons per hour and t is measured in hours starting at 12:00 am. (So, at 12 midnight, $t = 0$). Write a complete sentence, including units, interpreting each quantity below.

a. $f(8) = 2$

b. $\int_8^{10} f(t)\,dt = 28$