25 points possible. A graphing or scientific calculator is allowed. No aids are permitted. Show all work and use proper notation for full credit.

1. [9 points] Compute the following definite integrals.

a. $\displaystyle\int_{-2}^{2} \left(4 - x^2\right)\, dx$

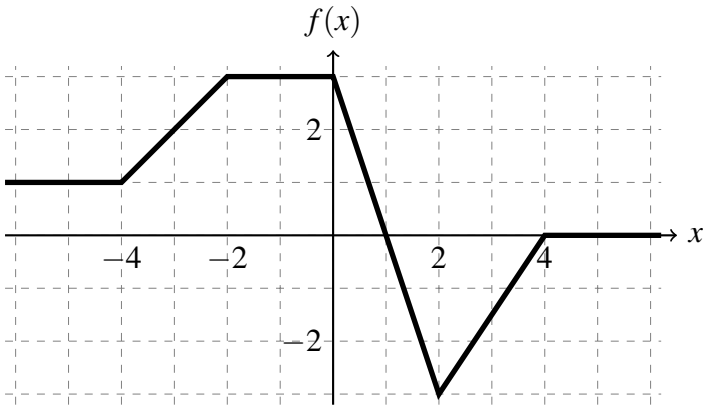
b. $\displaystyle\int_{0}^{\pi/2} \sin(t)\, dt$

c. $\displaystyle\int_{1}^{6} \frac{2 + x^2}{\sqrt{x}}\, dx$

2. [2 points] Compute the derivative of the following function:

$$f(x) = \int_{0}^{2x} \sqrt{1 + t^2}\, dt.$$

3. [6 points] The graph of f is shown. Evaluate each integral by interpreting it in terms of areas.



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

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

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

4. [8 points] Assuming $\int_1^5 f(x)\,dx = 3$, $\int_5^7 f(x)\,dx = -2$ and $\int_1^5 g(x)\,dx = 4$, compute the following.

a. $\int_1^5 2f(x)\,dx$

b. $\int_5^5 f(x)\,dx$

c. $\int_1^7 f(x)\,dx$

d. $\int_1^5 [f(x) - 2g(x)]\,dx$