**Instructions**

1. Write your *Name*, *PID*, *Section*, and *Exam Version* on the front of your Blue Book.
2. No calculators or other electronic devices are allowed during this exam.
3. You may use one page of notes, but no books or other assistance during this exam.
4. Read each question carefully, and answer each question completely.
5. Write your solutions clearly in your Blue Book.
   (a) Carefully indicate the number and letter of each question and question part.
   (b) Present your answers in the same order as they appear in the exam.
   (c) Start each numbered problem on a new side of a page.
6. Show all of your work. No credit will be given for unsupported answers, even if correct.
7. Write Name & PID on this exam sheet and return inside front cover of your Blue Book.

0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (6 points) The average value of a continuous function f for $4 \le x \le 9$ is 5.
   Find $\displaystyle\int_4^9 \left(2f(x) + 5\right)\, dx$.

2. (6 points) For a function f, you are given **the graph of its derivative** f' and that $f(0) = 30$.
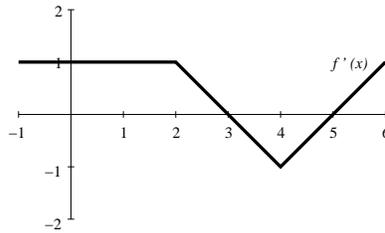
   (a) On the interval $0 \le t \le 5$, at what value of t does f reach its
      i. maximum value?
      ii. minimum value?
   (b) Compute the
      i. maximum value of f.
      ii. minimum value of f.
   (c) Compute $f(5) - f(0)$.

3. (6 points) Let $F(x) = \displaystyle\int_1^x \sec(t)dt$.
   (a) Find $F(1)$.
   (b) Find $F'(x)$.

4. (6 points) A space mission is exploring a high-gravity planet using a robot. If the acceleration due to gravity is 20 meters per second squared and the robot shoots a probe straight up from ground level with an initial velocity of 100 meters per second, what is the maximum height above the ground that the probe will reach?

(This exam is worth 25 points.)