Your Name   Your Signature

Student ID #

	Christine	Katie	
Section (Tues.)	12:30	12:30	1:30
(circle one)	CB	CA	CC

Problem	Total Points	Score
1	12	
2	6	
3	8	
4	12	
5	12	
Total	50	

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.

- Do not share notes.

- Graphing calculators are not allowed.

- In order to receive credit, you must show your work. Do not do computations in your head. Instead, write them out on the exam paper.

- **Place a box around** $\boxed{\text{YOUR FINAL ANSWER}}$ **to each question.**

- If you use a trial and error (or guess and check) method when an algebraic method is available, you will not receive full credit.

- If you need more room, use the backs of the pages and indicate to the reader that you have done so.

- Raise your hand if you have a question.

1 (12 points)   Compute the following integrals. Give your answers in exact form.

(a) (4 points) $\displaystyle\int_{1}^{\sqrt{3}} \frac{5}{1+y^2}\, dy$

(b) (4 points) $\displaystyle\int_{0}^{\pi/4} \sec^2(\theta) \cos\left(\tan(\theta)\right)\, d\theta$

(c) (4 points) $\displaystyle\int \frac{3x^2}{\sqrt{2-x}}\, dx$

2 (6 points)   Compute the integral $\displaystyle\int_{-1}^{3} \left| 4t - t^3 \right| \, dt$.

3 (8 points)   Let $\displaystyle f(x) = \int_{x^2}^{9} \cos\left(\pi\sqrt{t}\right) \, dt$. Compute the equation of the tangent line to $y = f(x)$ at the point where $x = 3$.

4 (12 points)   The graph of the function $y = f(x)$ is shown to the right.   It consists of line segments, and all the corners are at points with integer coefficients. Let

$$g(x) = \int_0^x f(v)\, dv.$$

(a) (4 points)   Compute $f(4)$ and $f(8)$.

y=f(x)
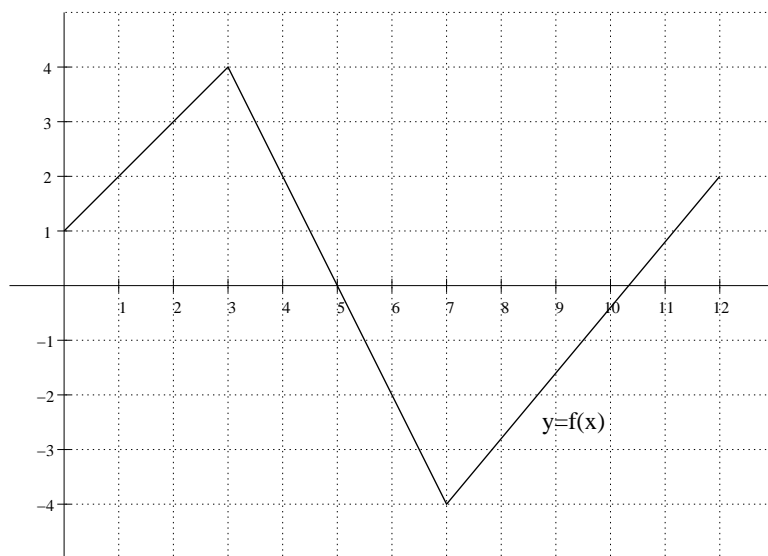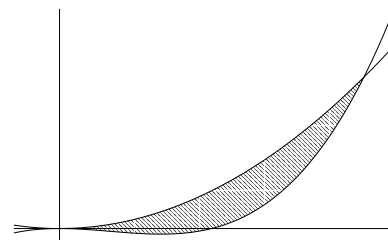
(b) (4 points)   Compute $g(5)$ and $g(9)$.

(c) (4 points)   Compute the maximum value of $g(x)$ on the interval $[0, 12]$

5   (12 points)   Let R be the region in the first quadrant bounded by $y = x^2$ and $y = x^3 - x^2$. Set up the following integrals.

DO NOT EVALUATE.

(a) (6 points)   Set up an integral that computes the volume of the solid generated by rotating R around the line $y = 4$ using the method of washers.

(b) (6 points)   Set up an integral that computes the volume of the solid generated by rotating R around the y-axis using the method of shells.