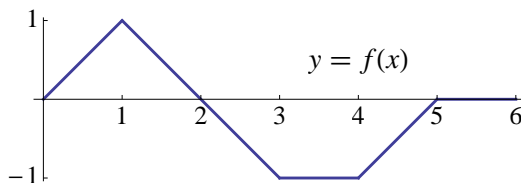




University of California, San Diego
Department of Mathematics

Instructions: Turn off and put away your cell phone. No calculators or electronic devices are allowed. You may use one page of notes, but no books or other assistance. Show all of your work; no credit will be given for unsupported answers. No credit will be given for illegible solutions. **(This is a two-sided exam.)**

1. (10 points) The graph below is the graph of $y = f(x)$.



- (a) Evaluate: $\int_0^6 f(x)dx =$
- (b) Suppose F is an anti-derivative of f . On which interval(s) is F decreasing?
- (c) In your **Blue Book**, create a table like this:

| | | | | | | | |
|--------|---|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| $F(x)$ | | | | | | | |

If $F(0) = 2$, fill in the table of values for $F(x)$.

2. (5 points) Let f and g be two functions. Somehow you know the values of the following definite integrals:

$$\int_1^2 f(x)dx = 9, \quad \int_1^5 f(x)dx = -2, \quad \int_1^2 g(x)dx = 3.$$

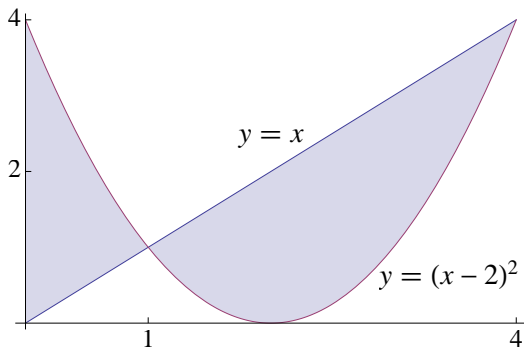
Calculate the following definite integrals:

- (a) $\int_1^2 (-2f(x) + 5g(x))dx =$
- (b) $\int_2^1 f(x)dx =$
- (c) $\int_2^5 f(x)dx =$

(Please turn over.)

3. (7 points) Suppose $\int_0^9 \left(x^{1/2} + \frac{2Q}{3}\right) dx = 5$, where Q is constant. Determine the value of Q .

4. (8 points) Below are the graphs of $y = x$ and $y = (x - 2)^2$. Use the Fundamental Theorem of Calculus to find the exact area of the shaded region. Note the curves intersect at $x = 1$ and $x = 4$.



(This exam is worth 30 points.)