The assigned homework exercises after Test 2 form the coverage for Test 3. The following items are additional practice problems.

1. Solve the problems about a free-falling object.
   (a) A ball is thrown upward from an initial height of 64 feet above the ground. If the ball reaches a maximum height of 100 feet from the ground, determine the initial velocity at which the ball was thrown.

   \[ \text{answer: 48 ft/sec} \]

   (b) A coin is dropped from a certain height above the ground. If the coin hits the ground at a speed of 80 ft/sec, determine the height from which the coin was dropped.

   \[ \text{answer: 100 ft} \]

2. Determine the area of the indicated region. Shade and include a sketch of the region.
   (a) A region is bounded by the graph of \( y = x^2 - 6x + 5 \) and the \( x \)-axis. \[ \text{answer: } \frac{32}{3} \]
   (b) A region is bounded by the graphs of \( y = 4\sqrt{x} \) and \( y = x \). \[ \text{answer: } \frac{128}{3} \]
   (c) A region is bounded by the graphs of \( y = 2x - 1 \), \( y = 5 \), and \( x = 0 \). \[ \text{answer: 9} \]
   (d) A region is bounded by the graphs of \( y = 2x - 6 \) and \( y = x^2 - 2x - 3 \). \[ \text{answer: } \frac{4}{3} \]
   (e) A region is bounded by the graphs of \( y = 1 + 2\sqrt{x} \), \( y = 1 \), and \( x = 4 \). \[ \text{answer: } \frac{32}{3} \]
   (f) A region is bounded by the graphs of \( y = x^2 - 4x + 3 \) and \( y = 3 \). \[ \text{answer: } \frac{32}{3} \]

3. Apply the limit process in evaluating the definite integral.
   (a) \[ \int_2^6 4x \, dx \] \[ \text{answer: 64} \]
   (b) \[ \int_1^3 3x \, dx \] \[ \text{answer: 12} \]

4. Evaluate the integral.
   (a) \[ \int 2\sqrt{x}(2x - 3)^2 \, dx \]
   \[ \text{answer: } \frac{2}{3}x^{3/2} + \frac{6}{5}x^{5/6} + C \]
   (b) \[ \int \frac{x + \sqrt{x}}{\sqrt{x}} \, dx \]
   \[ \text{answer: } \frac{2}{3}x^{3/2} + \frac{6}{5}x^{5/6} + C \]
   (c) \[ \int x(3\sqrt{x} - 2)^2 \, dx \]
   \[ \text{answer: } -\frac{24}{5}x^{5/2} + 3x^3 + 2x^2 + C \]
   (d) \[ \int \left( \frac{2}{3x\sqrt{x}} - \frac{2}{x^2} \right) \, dx \]
   (e) \[ \int (2\sin(x) - \sec^2(x)) \, dx \]
   (f) \[ \int \csc(x)(\cot(x) - \csc(x)) \, dx \]
   (g) \[ \int \cot^2(x) \, dx \]
   (h) \[ \int \tan(x)(\sec(x) - \cot(x)) \, dx \]
   (i) \[ \int \tan^2(x) \, dx \]

5. A right triangle lies in the first quadrant. Two sides of the triangle lie in the coordinates axes, and the hypotenuse contains the point \( (2, 4) \). Write a function that describes the area of such a triangle. Determine the sign chart for the derivative of the function. Then find the minimum area of such a triangle.