1. Evaluate \( \int_0^\pi \int_{\pi/6}^{\pi/2} 2y \cos x \, dx \, dy \).
   (a) \( \frac{4 - \pi}{2} \)  
   (b) \( -\frac{\pi}{2} \)  
   (c) \( \frac{\pi - 4}{2} \)  
   (d) \( -\pi \)  
   (e) None of these

2. Evaluate \( \int_{R} \int \frac{x}{\sqrt{1 + y^2}} \, dA \) where \( R \) is the region in the first quadrant bounded by the graphs of \( y = x^2 \), \( y = 4 \), and \( x = 0 \).
   (a) \( \frac{1}{2} \sqrt{17} - 1 \)  
   (b) \( 4 \sqrt{17} - \frac{10 \sqrt{5}}{5} + 1 \)  
   (c) \( 68 \sqrt{17} \)  
   (d) \( 34 \sqrt{17} \)  
   (e) None of these

3. Evaluate \( \int_0^1 \int_{2x}^1 e^{x^2} \, dy \, dx \) by reversing the order of integration.
   (a) 0  
   (b) \( \frac{1}{4} (e^4 - 1) \)  
   (c) \( \frac{3e^4 + 1}{8} \)  
   (d) \( \frac{1}{4} e^4 \)  
   (e) None of these

4. Use a double integral to find the volume of the solid in the first octant bounded above by the plane \( z = 5 - 2y \) and below by the rectangle in the \( xy \)-plane: \( \{(x, y): 0 \leq x \leq 3, \ 0 \leq y \leq 2\} \).
   (a) 12  
   (b) 6  
   (c) 18  
   (d) 9  
   (e) None of these

5. Use polar coordinates to evaluate \( \int_{R} \int \sqrt{x^2 + y^2} \, dA \) where \( R \) is the region in the \( xy \)-plane enclosed by the graphs of \( x^2 + y^2 = 9 \).
   (a) \( \frac{512 \sqrt{2} - 40}{15} \)  
   (b) \( 6\pi \)  
   (c) \( 9\pi \)  
   (d) \( 18\pi \)  
   (e) None of these
6. Find the limits of integration for calculating the volume of the solid \( \Omega \) enclosed by the graph of \( y^2 = x, z = 0 \) and \( x + z = 1 \) if \( V = \iiint_{\Omega} dz \, dy \, dx \).

\[
\text{Graph In XY Plane - Go Ahead & Solve}
\]

(a) \( \int_0^1 \int_0^{\sqrt{x}} \int_0^{1-x} dz \, dy \, dx \)

(b) \( \int_0^1 \int_0^{\sqrt{x}} \int_0^{1-x} dz \, dy \, dx \)

(c) \( \int_0^1 \int_{-\sqrt{x}}^{\sqrt{x}} \int_0^{1-x} dz \, dy \, dx \)

(d) \( \int_0^1 \int_{-\sqrt{x}}^{\sqrt{x}} \int_0^{1-x} dz \, dy \, dx \)

(e) None of these

7. A lamina has the shape of a closed region bounded by the graphs of \( x^2 + y^2 = 4 \) and \( x + y = 2 \), and has a density function of \( p(x,y) = xy \). Make a 2-dimensional graph of the region, write the iterated integral for the moment of inertia about the y-axis, and solve to find \( I_y \).

8. Find the mass of the region from Exercise 7.