Hydrostatic Force

1. (a) A triangle with corners (0, 0), (5, 0) and (5, −10).
   (b) We set the bottom of the triangle to be the origin and y goes up.
   (c) With that set up our integral is
   \[ \rho g \int_0^{10} (10 - y) \frac{y}{2} \, dy \]
   (d) \[ \rho g \frac{250}{3} \]

2. \[ \rho g \int_0^5 (7 - y) \frac{3}{5} y \, dy = \rho g \frac{55}{2} \]

3. \[ \rho g \int_0^{\sqrt{5}} \frac{2y}{\sqrt{5}} (\sqrt{5} - y) \, dy = \frac{5}{3} \]

Center of Mass

1. \[ \left( \frac{32}{12\pi} + 1, \frac{32}{12\pi} - \frac{1}{2} \right) \]

2. (a) A triangle with corners (0, 0), (0, t) and (r, 0)
   (b) \[ M_x = \frac{1}{6} \rho (3r - 2)t^2 \]

3. (a) \[ M_x = \frac{824\sqrt{2}}{45} \rho \]
   (b) \[ M_y = 0 \]
   (c) \[ \left( \frac{103}{51}, 0 \right) \]

Approximation:

1. \[ \frac{1}{18} \]
2. \[ n > 10 \]
3. \[ \frac{1}{4} \]