



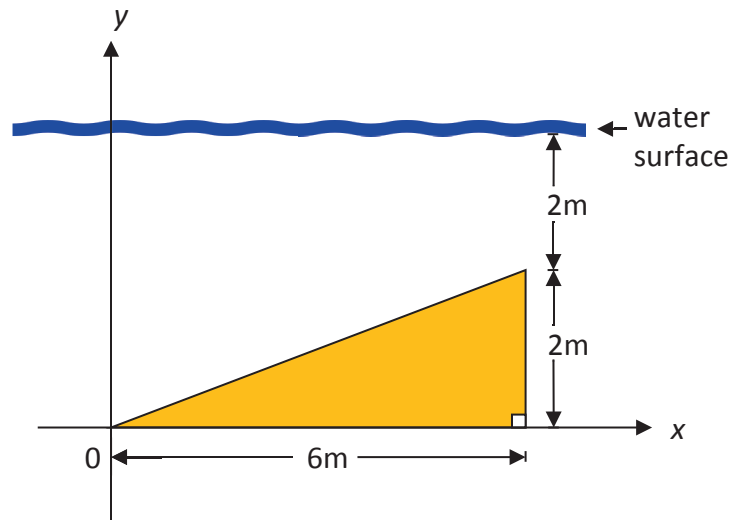
Name: _____

Mark:
25

MATH 101
Assignment 3

1. (5 marks) Find the center of mass (\bar{x}, \bar{y}) for the planar lamina having uniform density ρ bounded by the graphs of $x = -y + 2$ and $x = y^2$. Include a sketch of the region.

2. (3 marks) Find the fluid force on the vertical triangular plate submerged in water, where the weight-density of water is $9,800 \text{ N/m}^3$.



3. (3 marks) Evaluate the definite integral by integrating by parts using the Table method.

$$\int_0^1 4x^4 e^{-2x} dx$$

4. Find the following integrals.

(a) (2 marks) $\int \frac{1}{1 - e^x} dx$

(b) (2 marks) $\int \frac{1}{1 - \sin \theta} d\theta$

(c) (3 marks) $\int \sin 2x \sinh 3x \, dx$

(d) (2 marks) $\int \cosh^{-1} x \, dx$

(e) (2 marks) $\int \cos^3 7x \sin^2 7x dx$

(f) (3 marks) $\int_{\pi/3}^{\pi/2} \sin 5\theta \cos 3\theta d\theta$