Math 1B (7:30am – 8:20am)
Group Quiz 6
Tue Nov 3, 2009

Group Members' Names:
[Use the name you asked to be called]

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_____
_____

SCORE: ___ / 10 POINTS

Find the hydrostatic force on the vertical window of an aquarium if the window is a triangle of height 1 foot and base 2 feet, with the base down and 10 feet below the surface of the water. (The base of the triangle is 10 feet below the surface of the water.)

SCORE: ___ / 5 POINTS

$$\int_0^1 \rho(9+x)(2x)\,dx$$

$$= \rho\int_0^1 (18x + 2x^2)\,dx$$

$$= \rho\left(9x^2 + \frac{2x^3}{3}\right)\Big|_0^1$$

$$= \rho\left(9 + \frac{2}{3}\right)$$

$$= \frac{29}{3}\rho \text{ lb}$$

A spherical tank of radius 4 feet containing water is buried underground, so that its center is 8 feet below ground level. Find the work done in pumping the top half of the water to ground level if the tank is full.

SCORE: ___ / 5 POINTS

$$\int_0^4 \rho\pi(8-x)(\sqrt{16-x^2})^2\,dx$$

$$= \rho\pi\int_0^4 (8-x)(16-x^2)\,dx$$

$$= \rho\pi\int_0^4 (128 - 16x - 8x^2 + x^3)\,dx$$

$$= \rho\pi\left(128x - 8x^2 - \frac{8x^3}{3} + \frac{x^4}{4}\right)\Big|_0^4$$

$$= \rho\pi\left(128(4) - 8(16) - \frac{8(64)}{3} + \frac{256}{4}\right)$$

$$= \frac{832}{3}\rho\pi \text{ ft-lb}$$