

REVIEW QUESTIONS FOR QUIZ #6

1) Centroids – Find the coordinates of the centroid for the given areas:

- a. The area bounded by $y = x^4$, $x = 2$ and the $x - axis$
- b. The area bounded by a semicircle passing through $(-15,0)$ whose center is on the origin and diameter lies along the y -axis.

2) Force due to Fluid Pressure

- a. A horizontal storage tank has circular ends which are 7 meters in radius. Find the force due to fluid pressure on the circular end when it is half full of oil (the specific weight of oil is 9.4 kN/m^3)
- b. A dam is in the shape of the area bounded by $y = x^2$ and $y = 18$. Find the force on the area below $y = 9$ if the surface of the water is at the top of the dam. (the unit weight of water is 9.8 kN/m^3)

3) Arc Length – Find the length of the curve for each of the following:

- a. $y = 0.04x^{\frac{3}{2}}$ from $x = 0$ meters to $x = 30$ meters (use manual integration)
- b. $y = \frac{x^3}{6} + \frac{1}{2x}$ from $x = 1 \text{ m}$ to $x = 2 \text{ m}$ (use your calculator to integrate)

ANSWERS

1a) $\bar{x} = \frac{5}{3}$ and $\bar{y} = \frac{40}{9}$

b) $\bar{x} = \frac{-20}{\pi}$ and $\bar{y} = 0$

2a) 2150 kN

b) 4450 kN

3a) 30.8 meters

b) 1.42 meters