September 14, 2012

NAME

Fluids-ID

Quiz 3. The quarter circle gate BC in Figure 1 is hinged at C. Find the horizontal force P required to hold the gate stationary. The gate width into the paper is 3 m. Neglect the weight of the gate.

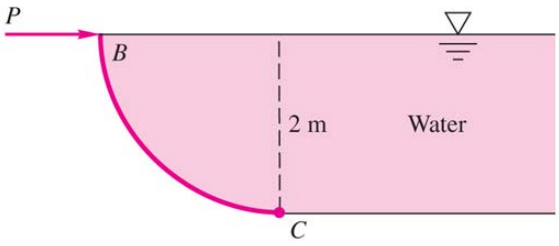
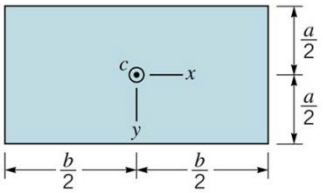


Figure 1

Resources:

- $F_H = \bar{p}A_{proj}$; $F_V = \gamma \forall$
- $y_{cp} = \bar{y} + I_{xc}/\bar{y}\,A_{proj}$; $x_{cp} = \bar{x}$ of $\forall$
- γ = 9,780 N/m^3 for water

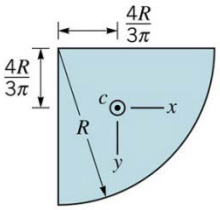


$A = ba$

$I_{xc} = \frac{1}{12}ba^3$

$I_{yc} = \frac{1}{12}ab^3$

$I_{xyc} = 0$



$A = \frac{\pi R^2}{4}$

$I_{xc} = I_{yc} = 0.05488R^4$

$I_{xyc} = -0.01647R^4$