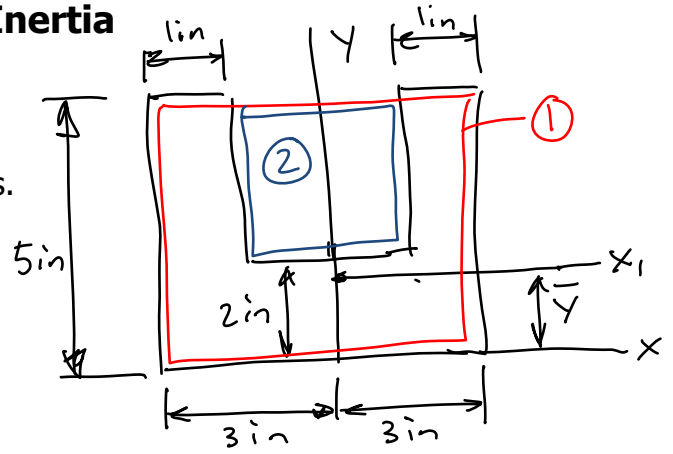


## Moment of Inertia

**Problem Statement:** Determine the y-coordinate of the centroid and moment of inertia about the  $x_1$ -axis.



Shape	$A$ (in <sup>2</sup> )	$\tilde{y}$ (in)	$\tilde{y}A$ (in <sup>3</sup> )
①	$(6)(5) = 30$	$\frac{1}{2}(5) = 2.5$	75
②	$-(4)(3) = -12$	$2 + \frac{1}{2}(3) = 3.5$	-42
	$\underline{\Sigma A = 18 \text{ in}^2}$		$\underline{\Sigma \tilde{y}A = 33 \text{ in}^3}$

$$\bar{y} = \frac{33 \text{ in}^3}{18 \text{ in}^2} = \boxed{1.83 \text{ in}}$$

$I_{x_1}$	$I_{x'}$ (in <sup>4</sup> )	$y_d$ (in)	$A$ (in <sup>2</sup> )	$y_d^2 A$ (in <sup>4</sup> )
①	$\frac{1}{12}(6)(5)^3 = 62.5$	$2.5 - 1.83 = 0.67$	30	13.47
②	$\frac{-1}{12}(4)(3)^3 = -9$	$3.5 - 1.83 = 1.67$	-12	-33.47
	$\underline{\Sigma I_{x'} = 53.5}$			$\underline{\Sigma y_d^2 A = -20}$

$$I_{x_1} = 53.5 - 20$$

$$\boxed{I_{x_1} = 33.5 \text{ in}^4}$$