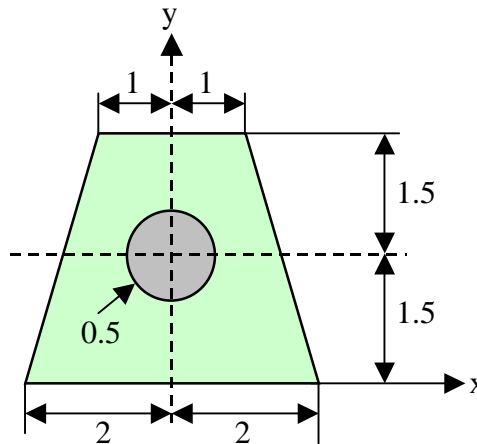


## AREA MOMENT OF INERTIA

### Problem 4:

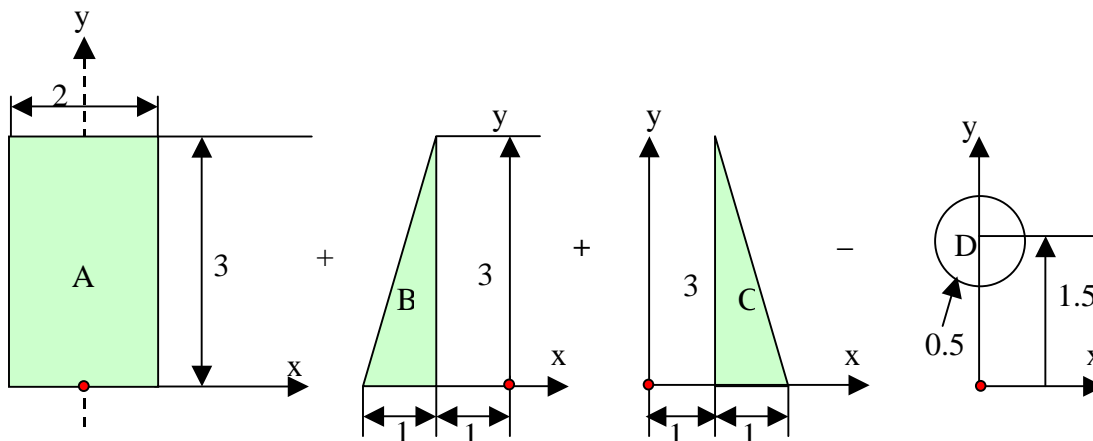
Determine the area moment of inertia of the composite area about

- a) the x-axis
- b) the y-axis



### Solution:

The composite area consists of 4 component parts:



Part	Area, A	$d_x$	$d_y$	$Ad_x^2$	$Ad_y^2$	$I_{x_0}$	$I_{y_0}$
<b>Unit</b>	$(in^2)$	$(in)$	$(in)$	$(in^4)$	$(in^4)$	$(in^4)$	$(in^4)$
<b>A</b>	$3(2)=6$	1.5	0	13.5	0	$(2)(3)^3/12= 4.5$	$(3)(2)^3/12=2$
<b>B</b>	$(1)(3)/2=1.5$	1	-1.33	1.5	2.65	$(1)(3)^3/36= 0.75$	$(3)(1)^3/36= 0.083$
<b>C</b>	$(1)(3)/2=1.5$	1	1.33	1.5	2.65	$(1)(3)^3/36= 0.75$	$(3)(1)^3/36= 0.083$
<b>D</b>	$-\pi(0.5)^2 = -0.25\pi$	1.5	0	$-0.5625\pi$	0	$-(\pi)(0.5)^4/4 = -0.0156\pi$	$-(\pi)(0.5)^4/4 = -0.0156\pi$
Sum of columns:				14.73	5.3	5.95	2.118

$$I_x = \sum I_{x_0} + \sum Ad_x^2 = 20.68 \text{ in}^4$$

$$I_y = \sum I_{y_0} + \sum Ad_y^2 = 7.42 \text{ in}^4$$