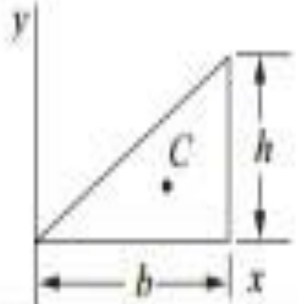
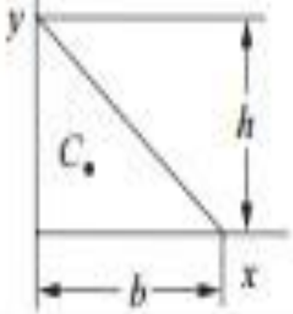
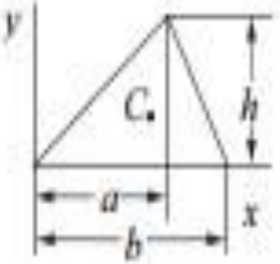
I_x for triangle

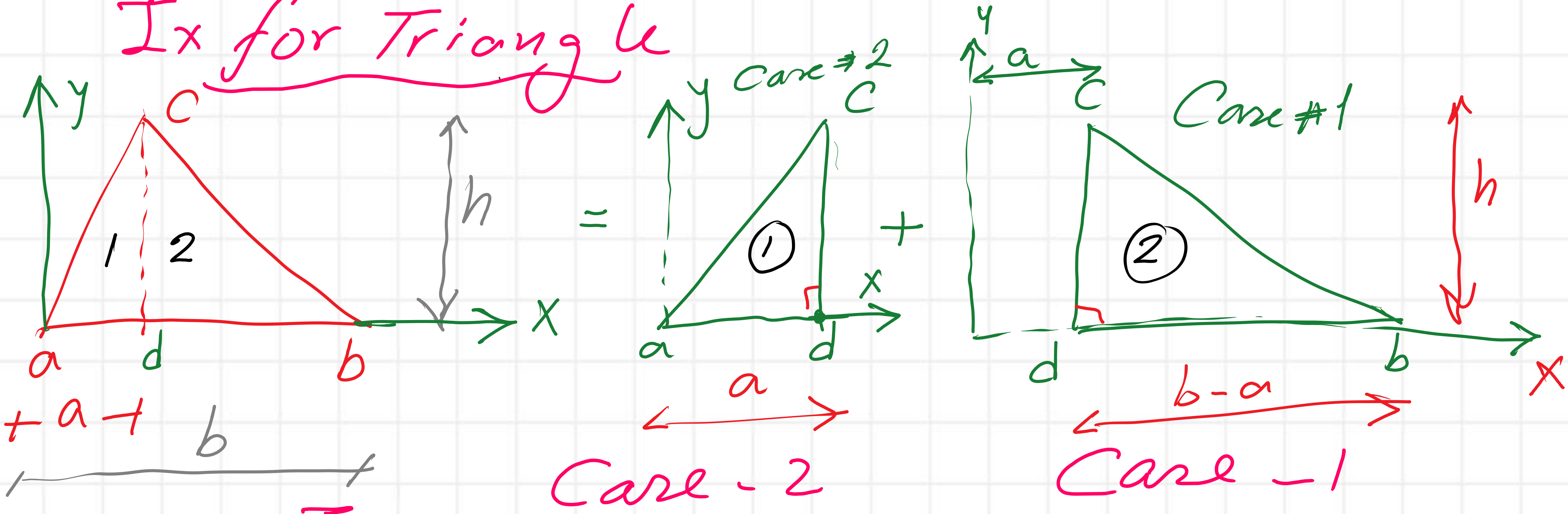
Figure	Area & Centroid	Area Moment of Inertia	(Radius of Gyration)^2	Product of Inertia
	$A = bh/2$ $x_c = 2b/3$ $y_c = h/3$	$I_{x_c} = bh^3/36$ $I_{y_c} = b^3h/36$ $I_x = bh^3/12$ $I_y = b^3h/4$	$r_{x_c}^2 = h^2/18$ $r_{y_c}^2 = b^2/18$ $r_x^2 = h^2/6$ $r_y^2 = b^2/2$	$I_{x_c y_c} = Abh/36 = b^2h^2/72$ $I_{xy} = Abh/4 = b^2h^2/8$
	$A = bh/2$ $x_c = b/3$ $y_c = h/3$	$I_{x_c} = bh^3/36$ $I_{y_c} = b^3h/36$ $I_x = bh^3/12$ $I_y = b^3h/12$	$r_{x_c}^2 = h^2/18$ $r_{y_c}^2 = b^2/18$ $r_x^2 = h^2/6$ $r_y^2 = b^2/6$	$I_{x_c y_c} = -Abh/36 = -b^2h^2/72$ $I_{xy} = Abh/12 = b^2h^2/24$
	$A = bh/2$ $x_c = (a+b)/3$ $y_c = h/3$	$I_{x_c} = bh^3/36$ $I_{y_c} = [bh(b^2 - ab + a^2)]/36$ $I_x = bh^3/12$ $I_y = [bh(b^2 + ab + a^2)]/12$	$r_{x_c}^2 = h^2/18$ $r_{y_c}^2 = (b^2 - ab + a^2)/18$ $r_x^2 = h^2/6$ $r_y^2 = (b^2 + ab + a^2)/6$	$I_{x_c y_c} = [Ah(2a-b)]/36$ $= [bh^2(2a-b)]/72$ $I_{xy} = [Ah(2a+b)]/12$ $= [bh^2(2a+b)]/24$

$I_x = \frac{hb^3}{12}$

Our Case

$I_{xc} = bh^3/36$

Ix for Triangle



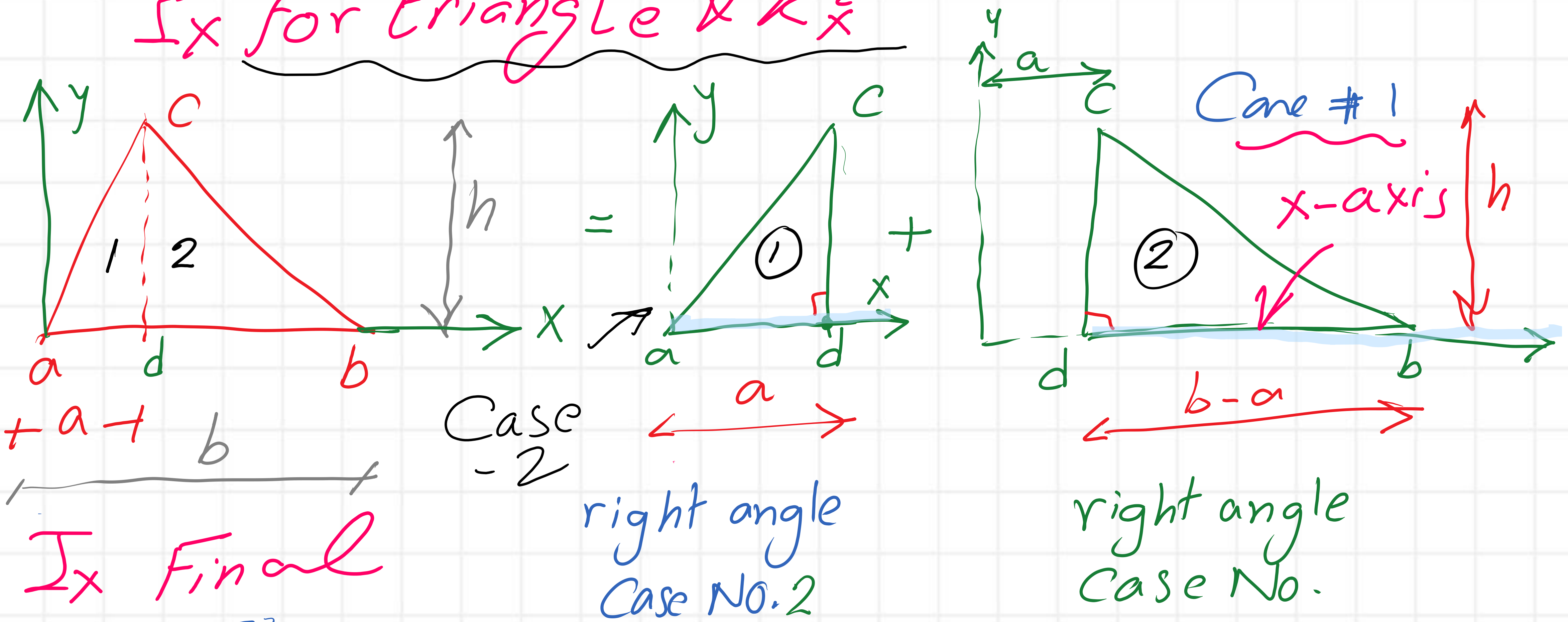
Add $I_x = I_{x_1} + I_{x_2}$

For No. 2 - Triangle : $I_{x_1} = \frac{base(HT)^3}{12} = \frac{a(h)^3}{12}$

while for No. 1 - Triangle $I_{x_2} = \frac{base(HT)^3}{12} = \frac{(b-a)(h)^3}{12}$

We can add these value same x axis

I_x for triangle & $\bar{K}_x^2$



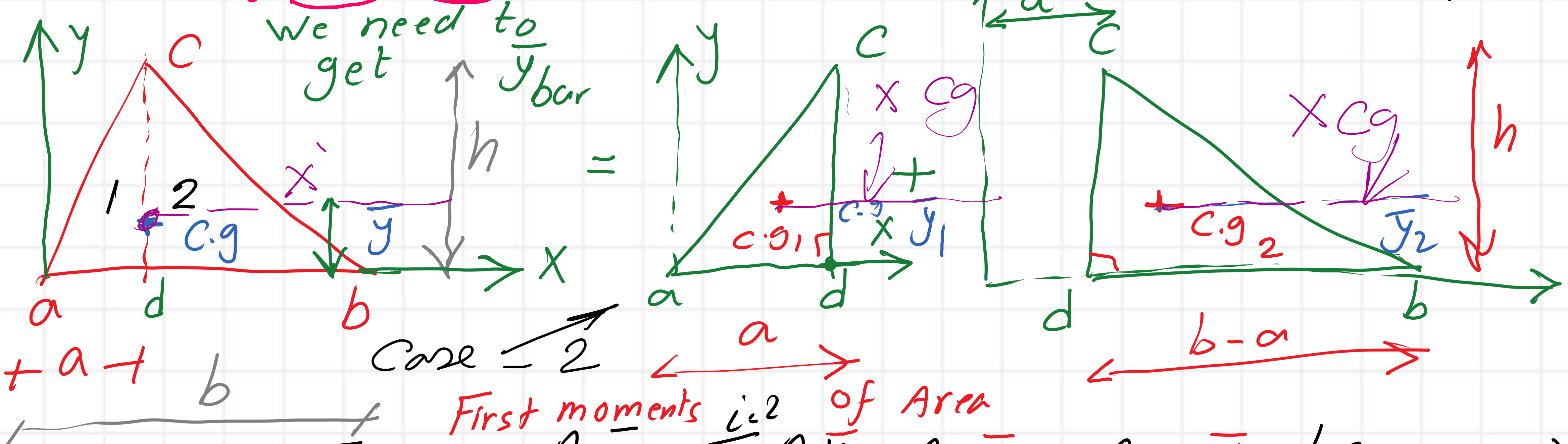
I_x Final

$$= \frac{a\bar{h}^3}{12} + \frac{(b-a)(h^3)}{12} = \frac{1}{12}h^3(a+b-a) = \frac{h^3(b)}{12} \rightarrow I_x = \frac{h^3 b}{12}$$

$$\bar{K}_x^2 = \frac{I_{xF}}{A} = \frac{h^3 b}{12} \times \frac{1}{(1/2)(hb)} = \frac{h^2}{6}$$

Ix for triangle at C.g

Case - 1



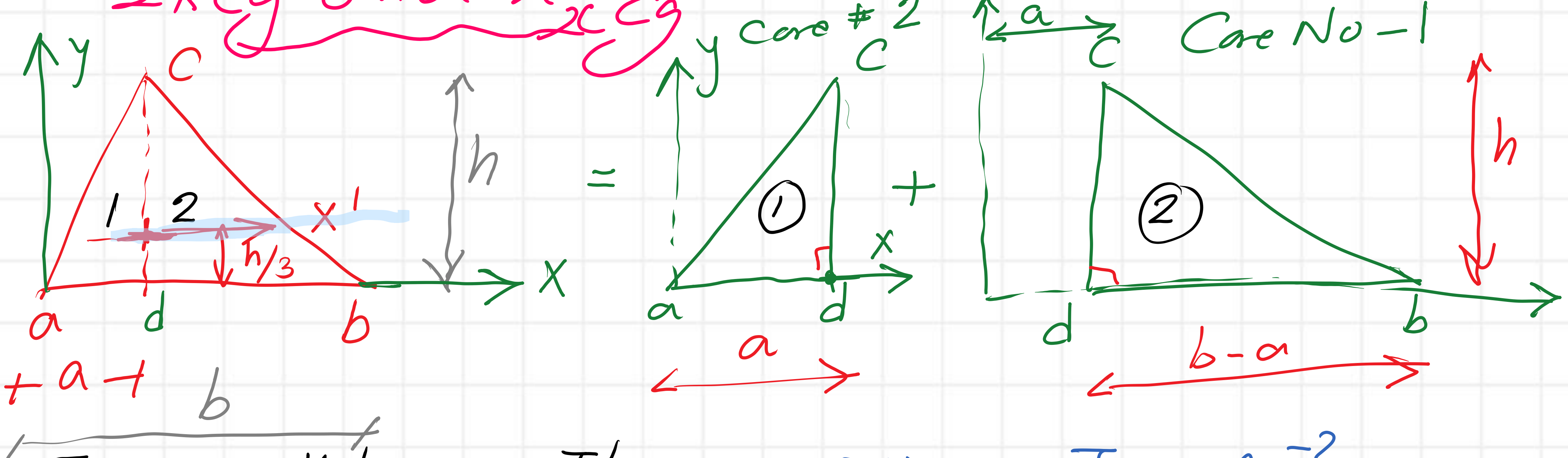
For C.g $\bar{y}$ $\Rightarrow$ $A\bar{y} = \sum_{i=1}^{i=2} A\bar{Y} = A_1\bar{y}_1 + A_2 \cdot \bar{y}_2 \,/\, (A_1 + A_2)$

$$\left(\frac{1}{2}\right) b h (\bar{y}) = \frac{1}{2} a \cdot h \left(\frac{h}{3}\right) + \frac{1}{2}(b-a) h \left(\frac{h}{3}\right)$$

$$\frac{1}{2} b h \bar{y} = \frac{1}{2} \frac{h^2}{3} (a + b - a) = \frac{h^2}{6} b$$

$$\bar{y} = \frac{1}{3} h$$

I_{xcg} and K^2_{xcg}



From parallel axes Theorem : $I_{x'bar} = I_x - A\bar{y}_b^2$

$$I_{xc.g} = \frac{bh^3}{12} - \left(\frac{1}{2}bh\right)\left(\frac{h}{3}\right)^2 = \frac{bh^3}{12}\left(1 - \left(\frac{12}{18}\right)\right) = \frac{bh^3}{36}$$

$$K^2_{x_{cg}} = \frac{I_{xc.g}}{A} = \frac{bh^3}{36}\left(\frac{1}{\frac{1}{2}bh}\right) = \frac{h^2}{18}$$

$$k_{cg} = \sqrt{\frac{h^2}{18}} = \frac{h}{3\sqrt{2}}$$