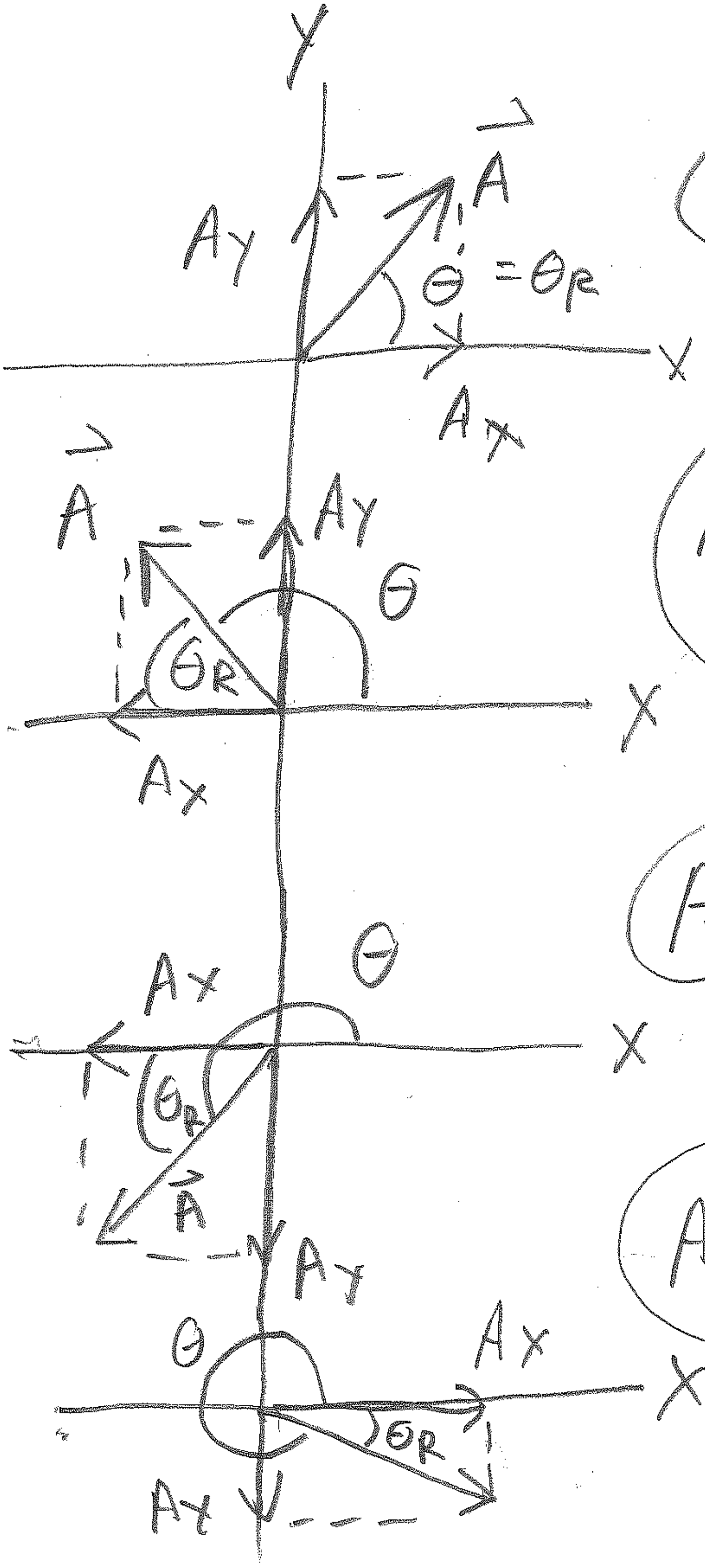
8-23-13

Components (sec 1.8)



$A_y, A_x > 0$

$\theta = \theta_R$

$A_y > 0$

$A_x < 0$

$\theta_R = 180 - \theta$

$A_y, A_x < 0$

$\theta_R = \theta - 180$

$A_x > 0$

$A_y < 0$

$\theta_R = 360^\circ - \theta$

IN ALL cases:

$$|\vec{A}| = A = \sqrt{A_x^2 + A_y^2}$$

and $\tan\theta_R = \dfrac{|A_y|}{|A_x|}$; $0 \leq \theta_R \leq 90^\circ$

θ_R = related (relative) angle

θ is angle relative to x-axis

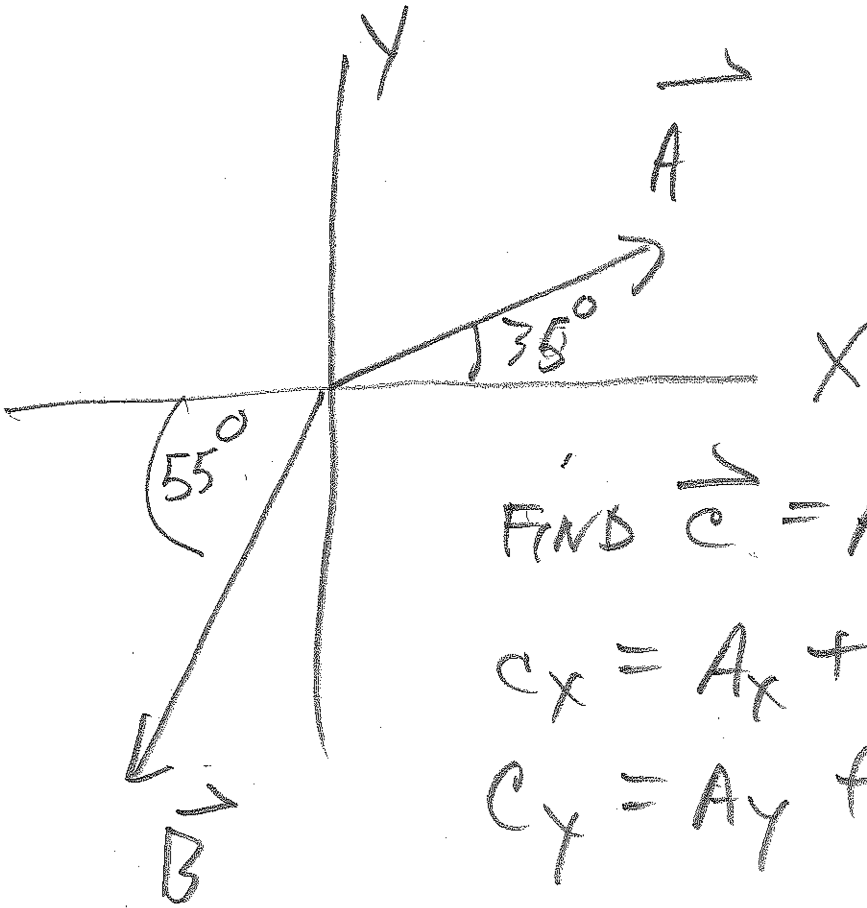
NOTE: $\vec{C} = \vec{A} + \vec{B}$ means

$C_x = A_x + B_x$

$C_y = A_y + B_y$

Examples: ex 1.6 page 18

NOTE: we __ADD__ the vectors.



FIND $\vec{C} = \vec{A} + \vec{B}$

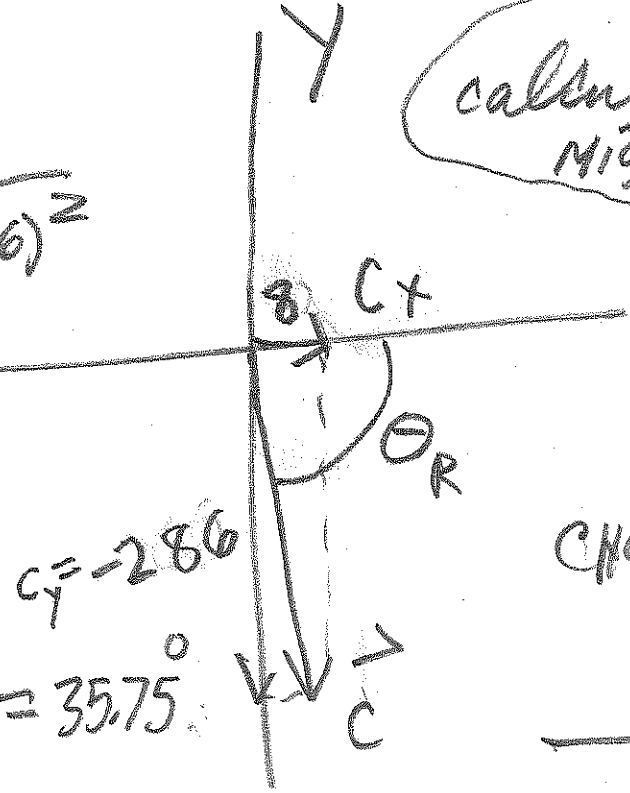
$C_x = A_x + B_x$

$C_y = A_y + B_y$

table	X	Y
$\vec{A}$	$A_x = 500 \cdot \cos 35^\circ = 410$	$A_y = 500 \cdot \sin 35^\circ = 287$
$\vec{B}$	$B_x = -700 \cdot \cos 55 = -402$	$B_y = -700 \cdot \sin 55 = -573$
SUM	$C_x = 8$	$C_y = -286$

$$|\vec{C}| = \sqrt{C_x^2 + C_y^2}$$
$$= \sqrt{8^2 + (-286)^2}$$
$$= 286.1$$

calculation might ignore sig. fig. rules.

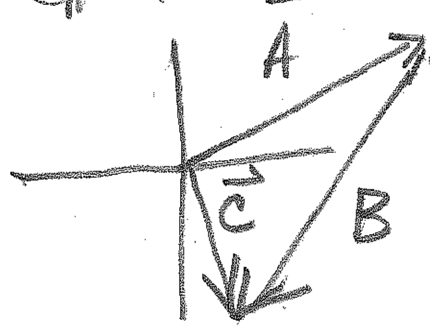


$$\tan\theta_R = \frac{|C_y|}{|C_x|}$$

$$\tan\theta_R = \frac{286}{8} = 35.75^0$$

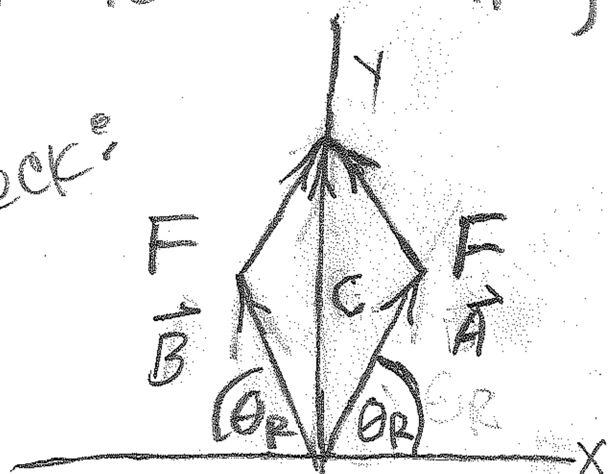
$$\theta_R = \tan^{-1}(37.75) = \boxed{88.4^0}$$

check:



HINT TO #38 CH1; #4, CH4

check:



$$|\vec{F}| = F$$
$$= |\vec{A}| = |\vec{B}|$$

$$\vec{C} = \vec{A} + \vec{B}$$
$$C_x = A_x + B_x$$
$$C_y = A_y + B_y$$

$$C_x = F\cdot\cos\theta_R - F\cos\theta_R = 0$$

$$C_y = F\cdot\sin\theta_R + F\sin\theta_R$$
$$= 2F\sin\theta_R$$

NOTE: $|\vec{C}| = \sqrt{C_x^2 + C_y^2} = \sqrt{C_y^2} = |C_y|$

USE HIGH SCHOOL GEOMETRY TO FIND θ_R.