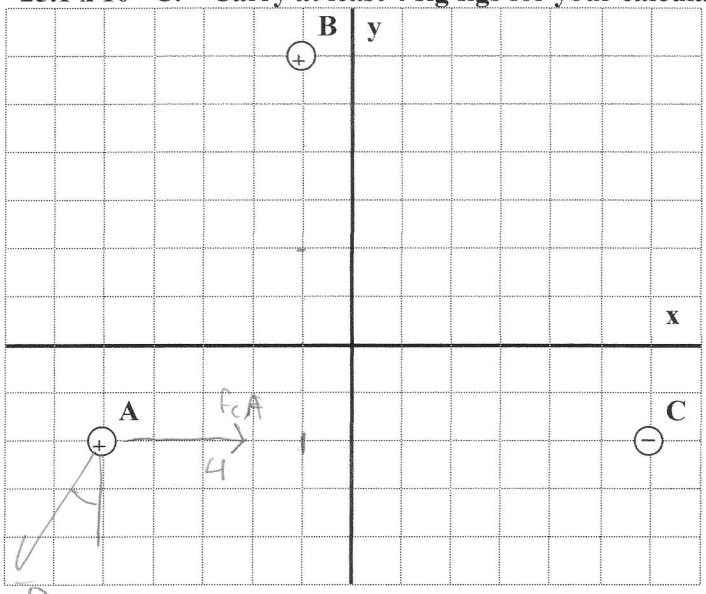
Field Theory

Vector Force 1: Each grid line is a meter. Charge A is +12.6 x 10^{-6} C, and charge B is +19.3 x 10^{-6} C, and C is -25.1 x 10^{-6} C. Carry at least 4 sig figs for your calculations.



(A) $|F_{BA}| = \frac{k(12.6E-6)(19.3E-6)}{4^2+8^2} = 2.7327E-2$ N

$|F_{CA}| = \frac{k(12.6E-6)(25.1E-6)}{11^2+0^2} = 2.3497E-2$

ignore - signs for Now

F_{BA}

$\theta =$

C(-) Attracts A(+)

B(+) repels A(+)

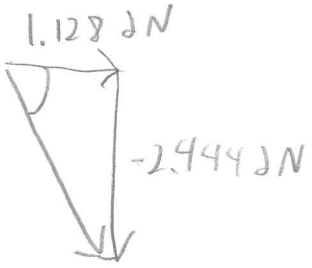
Calculate the force **on charge A** as a magnitude and a direction. The direction should be a trig angle. Draw the force vector above

	magnitude	trig. angle	x-comp	y-comp
F_{BA}	A 2.733 E-2	B 270-tan^{-1}(4/8) 243.4°	C -1.222 E-2 N	D -2.444 E-2 N
F_{CA}	F 2.3497E-2	G 0°	H 2.3497E-2 N	I 0 N
		$F_{BA} + F_{CA}$	M 1.1276 E-2N	N -2.444 E-2

Magnitude	Trig Angle
2.691N	294.767
2.69x10^{-2} N	295°

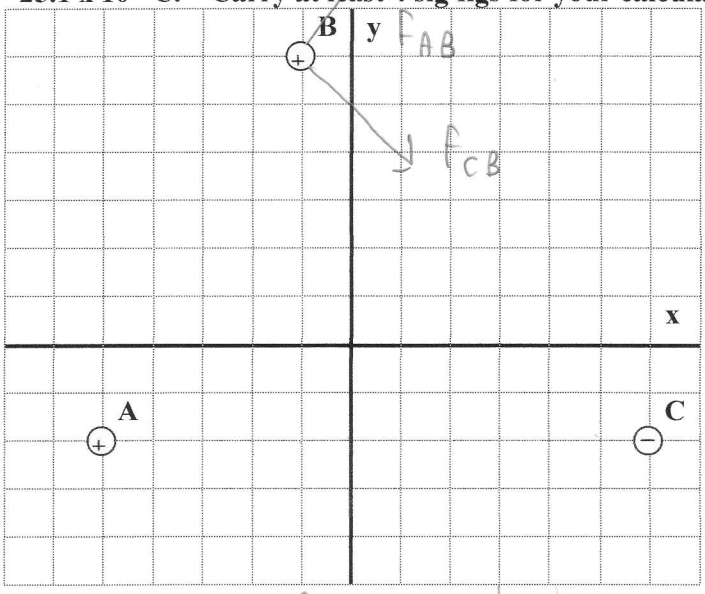
	charge	x	y
A	1.26E-05	-5	-2
B	1.93E-05	-1	6
C	2.51E-05	6	-2

	mag	angle	x	y
FBA	2.733E-02	243.4	-1.222E-02	-2.444E-02
FCA	2.350E-02	0	2.350E-02	0.000E+00
		total>	1.128E-02	-2.444E-02
		Mag	0.026918	
		angle	294.8	



360 - tan^{-1}(2.444/1.128)

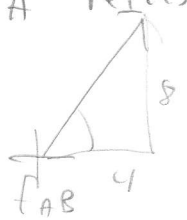
Vector Force 2: Each grid line is a meter. Charge A is +12.6 x 10^{-6} C, and charge B is +19.3 x 10^{-6} C, and C is -25.1 x 10^{-6} C. Carry at least 4 sig figs for your calculations.



$$|F_{AB}| = \frac{K(12.6E-6)(19.3E-6)}{(4^2+8^2)} = 2.7327E-2N$$

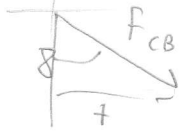
$$|F_{CB}| = \frac{K(25.1E-6)(19.3E-6)}{(7^2+8^2)}$$

A repels B



$\theta_{AB} = \tan^{-1}\left(\frac{8}{4}\right) =$

C Attracts B



$\theta_{CB} = 270 + \tan^{-1}\left(\frac{7}{8}\right) = 311.19°$

Calculate the force **on charge B** as a magnitude and a direction. The direction should be a trig angle. Draw the force vector above

	magnitude	trig. angle	x-comp	y-comp
F_{AB}	A 2.7327E-2 N	B 63.435°	C .012221 N	D .024442 N
F_{CB}	F 3.8540 E-2	G 311.2°	H .025379 N	I -.029004N
		$F_{AB} + F_{CB}$	J .037599 N	K -.004562 N

Magnitude	Trig Angle
.0378757	

$\sqrt{.037599^2 + .004562...^2}$

	charge	x	y
A	1.26E-05	-5	-2
B	1.93E-05	-1	6
C	2.51E-05	6	-2

	mag	angle	x	y
FAB	2.733E-02	63.43	1.222E-02	2.444E-02
FCB	3.854E-02	311.2	2.538E-02	-2.900E-02
		total>	3.760E-02	-4.562E-03
		Mag	0.0378757	
		angle	353.1	

$360 - \tan^{-1}\left(\frac{4.562}{37.599}\right)$

353.08