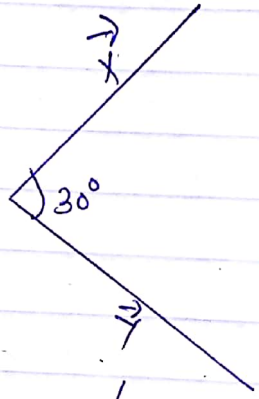
Question 2 The vectors $\vec{x}$ and $\vec{y}$ are unit vectors (1 unit long) that make an angle of 30° with each other. Calculate $|3\vec{x} - 2\vec{y}|$ include sketch.

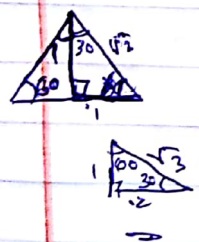


Vectors have magnitude of 1

$$|3\vec{x} - 2\vec{y}| = (3x - 2y)^2 = 9|x|^2 - 9 \cdot 4 x \cdot y + 4|y|^2$$

$$= 9 - 36\cos 30° + 4$$

$$= (13 - 18\sqrt{3})^{1/2}$$



$$= (13 - 18\sqrt{3})^{1/2}$$

$$= \sqrt{13 - 18\sqrt{3}}$$

$$= \sqrt{-18.176}$$

$$= \pm 4.26i$$

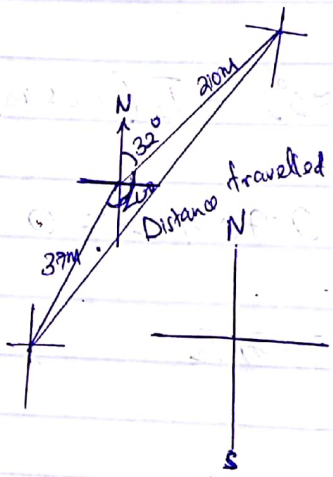
90-32

58
90

148
52

200

Question 3 : A bee felt flower to flower. If it leaves the hive and travel 210M N 32°E and then 37M S51°W. How far is it from the hive include the sketch.



$|D|^2 = 37^2 + 210^2 - 2(37 \times 210)\cos 200^\circ$

$|D|^2 = 1369 + 44100 - 2(7770)\cos 200^\circ$

$|D|^2 = 1369 + 44100 + 14602.8$

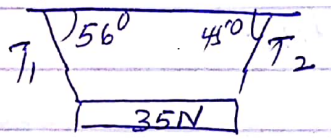
$|D|^2 = 60071.82$

$|D| = \sqrt{60071.82}$

$|D| = 245.09M$

The Bee is 245.09 M from the hive.

Question 4



Total tension $= -T_1(\cos 56^\circ) + T_2(\cos 45) = 0$

$-0.55919\,T_1 + 0.7071\,T_2 = 0$

$0.55919\,T_1 = 0.7071\,T_2$

$T_1 = \dfrac{0.7071\,T_2}{0.55919}$

$T_1 = 1.2645\,T_2$

$T_1 = T_1(\sin 56^\circ) + T_2 \sin 45 - 343 = 0$

$= 0.829\,T_1 + 0.707\,T_2 = 343$

$0.829 \times 1.2645\,T_2 + 0.707\,T_2 = 343$

$1.048\,T_2 + 0.707\,T_2 = 343$

$= 1.755\,27\,T_2 = 343$

$T_2 = \dfrac{343}{1.755\,27}$

$T_2 = 195.41\ N$

$T_1 = 1.2645 \times 195.41$

$T_1 = 247.09\ N$