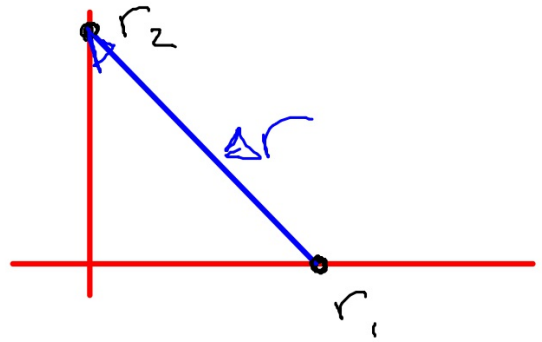


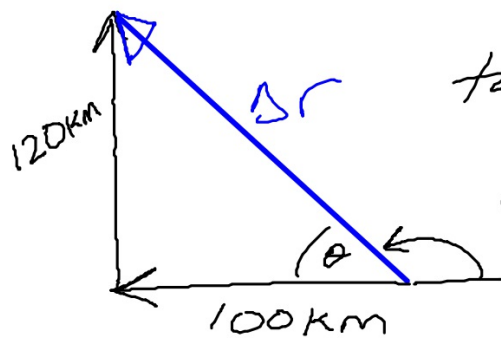
5. $r_1 = 100 \text{ km}, 0^\circ$
 $r_2 = 120 \text{ km}, 90^\circ$
 $\Delta r = ?$



$$\Delta r = r_2 - r_1$$

$$= (0\hat{i} + 120\hat{j}) - (100\hat{i} + 0\hat{j}) \text{ km}$$

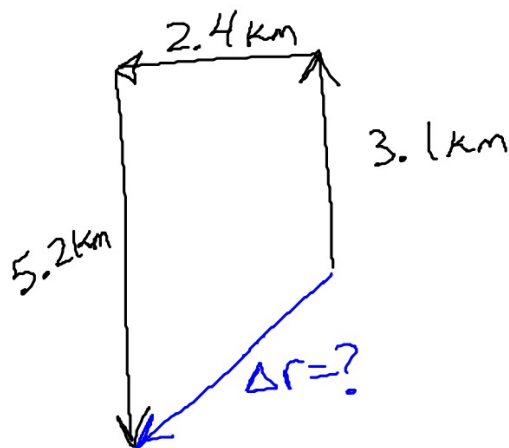
$$\Delta r = (-100\hat{i} + 120\hat{j}) \text{ km}$$



$$\tan \theta = \frac{120}{100} \quad \Delta r^2 = 120^2 + 100^2$$
$$\theta = 50.2^\circ$$

$$\Delta r = 156 \text{ km}, 129.8^\circ$$

8.



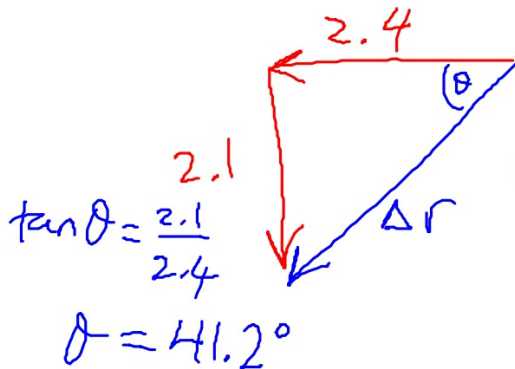
$$\Delta r = \Delta r_1 + \Delta r_2 + \Delta r_3$$

$$(0\hat{i} + 3.1\hat{j})$$

$$(-2.4\hat{i} + 0\hat{j})$$

$$(0\hat{i} - 5.2\hat{j})$$

$$\Delta r = (-2.4\hat{i} - 2.1\hat{j}) \text{ km}$$



$$\Delta r = 3.19 \text{ km}, 221.2^\circ$$

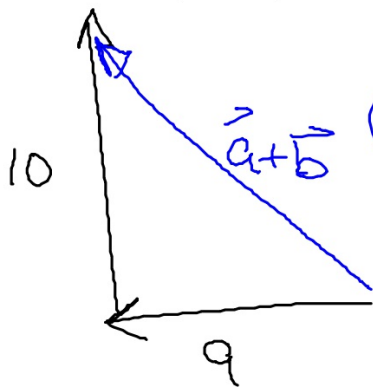
(41.2° south of west)

11. $\vec{a} + \vec{b} = ?$

$$\vec{a} = 4\hat{i} + 3\hat{j} \quad \vec{b} = -13\hat{i} + 7\hat{j}$$

$$\vec{a} + \vec{b} = (-9\hat{i} + 10\hat{j}) \text{ m}$$

b + c) polar form!



$$\vec{a} + \vec{b} = 13.5 \text{ m}, 132^\circ$$

16. $\vec{a} = 3\hat{i} + 4\hat{j}$ $\vec{b} = 5\hat{i} - 2\hat{j}$

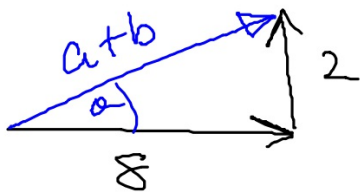
a) $\vec{a} + \vec{b} = ?$
 $= (8\hat{i} + 2\hat{j})\text{m}$

d) $\vec{b} - \vec{a} = ?$
 $= (2\hat{i} - 6\hat{j})\text{m}$

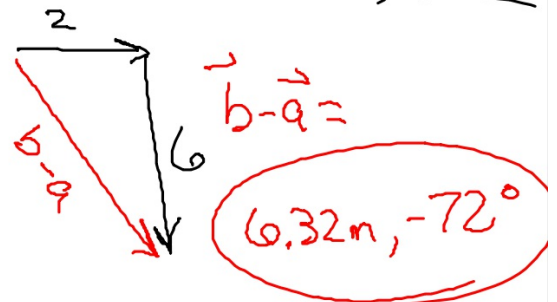
b+c) polar form

$a+b = 8.25\text{m}, 14^\circ$

e+f) polar



$\tan \theta = \frac{2}{8}$



15. $\vec{a} + \vec{b} = ?$

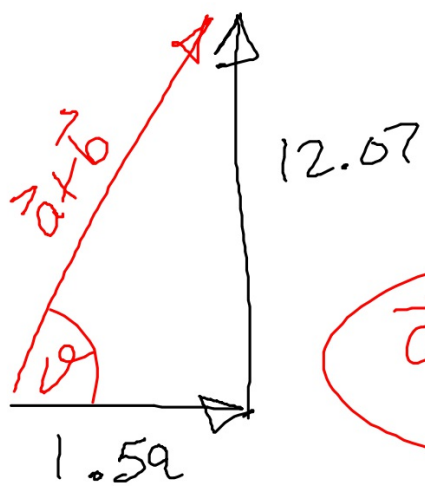
$$\vec{a} = 10\text{ m}, 30^\circ$$

$$\vec{b} = 10\text{ m}, 135^\circ$$

$$\vec{a} = (8.66\hat{i} + 5\hat{j})\text{ m}$$

$$\vec{b} = (-7.07\hat{i} + 7.07\hat{j})\text{ m}$$

$$\vec{a} + \vec{b} = (1.59\hat{i} + 12.07\hat{j})\text{ m}$$



$$\vec{a} + \vec{b} = 12.2m, 82.5^\circ$$