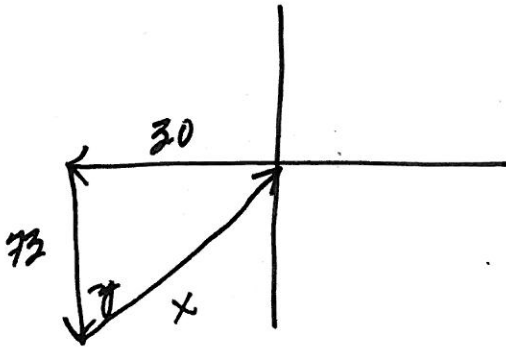


\*AAT

Chapter 8: Vector Review Sheet (IC)

Name: Key  
Date: \_\_\_\_\_ Period: \_\_\_\_\_

In a regatta, a sailboat sailed 30 km west and 73 km south from port, and then took the shortest route back. Find the distance and direction of the return trip, relative to the north.



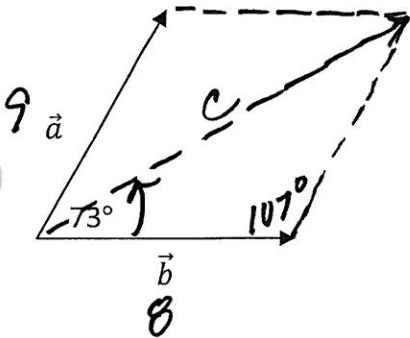
$$73^2 + 30^2 = x^2$$
$$73^2 + 30^2 = 6229$$

$$x = \sqrt{6229} = 78.9 \text{ km}$$

$$\tan \theta = \frac{30}{73}$$

$$\theta = 22.3^\circ \text{ east of North}$$

2. Use the parallelogram method to find the vector sum  $\vec{c} = \vec{a} + \vec{b}$ . Use the law of cosines to find  $|\vec{c}|$ , the magnitude of  $\vec{c}$ . Use the law of sines to find the angle that  $\vec{c}$  makes with  $\vec{b}$ .



$$|\vec{b}| = 8; |\vec{a}| = 9$$

$$c^2 = 8^2 + 9^2 - 2(8)(9) \cos 107^\circ$$

$$c^2 = 145 + 42.1$$

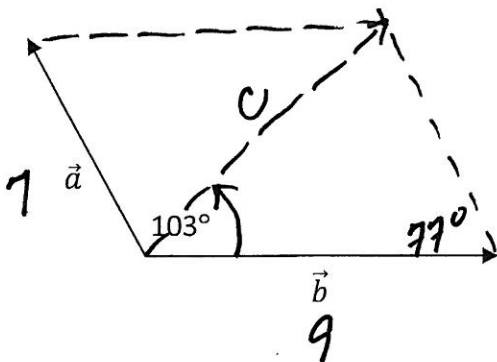
$$c^2 = 187.1$$

$$\vec{c} = 13.7$$

$$\frac{\sin 107}{13.7} = \frac{\sin x}{9}$$

$$x = 38.9^\circ$$

3. Use the parallelogram method to find the vector sum  $\vec{c} = \vec{a} + \vec{b}$ . Use the law of cosines to find  $|\vec{c}|$ , the magnitude of  $\vec{c}$ . Use the law of sines to find the angle that  $\vec{c}$  makes with  $\vec{b}$ .



$$|\vec{b}| = 9; |\vec{a}| = 7$$

$$c^2 = 7^2 + 9^2 - 2(7)(9) \cos 103^\circ$$

$$c^2 = 130 - 28.34$$

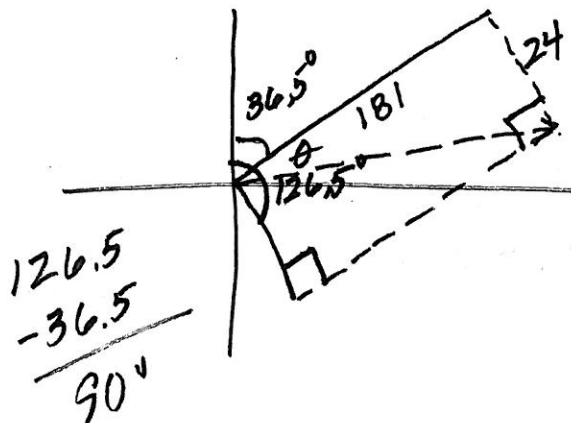
$$c^2 = 101.66$$

$$\vec{c} = 10.1$$

$$\frac{\sin 103}{10.1} = \frac{\sin x}{7}$$

$$x = 42.5^\circ$$

4. A plane is flying at 181 miles per hour with a heading of  $36.5^\circ$  from due north. The wind is blowing a constant 24 miles per hour at  $126.5^\circ$  from due north. Find the ground speed and true course of the plane.



$$a^2 + b^2 = c^2$$

$$181^2 + 24^2 = c^2$$

$$c \approx 182.6 \text{ mph}$$

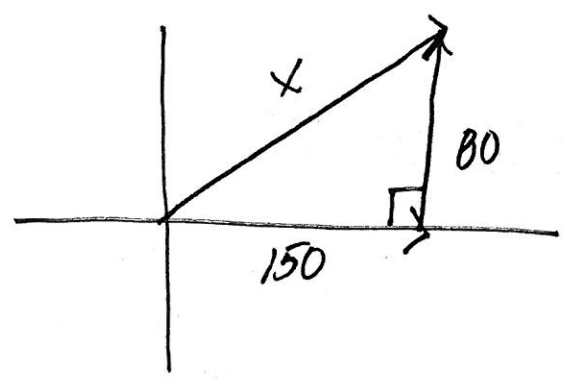
$$\tan \theta = \frac{24}{181}$$

$$\frac{36.5}{+ 7.6}$$

$$\theta = 7.6$$

$$44.1^\circ \text{ heading from N}$$

5. While flying due east at 150 km/hr, an airplane is also carried northward at 80 km/hr by the wind blowing due north. What is the plane's resultant speed?



$$80^2 + 150^2 = X^2$$

$$28900 = X^2$$

$$170 = X$$