

Name: key

Headings Practice Day!

1. Find the resultant magnitude & direction for the following headings.

Heading of W 20° S for 6 miles then N 70° W for 4 miles.

$$\vec{x}^2 = 4^2 + 6^2 - 2 \cdot 4 \cdot 6 \cos(140)$$
$$|\vec{x}| \approx 9.42 \text{ miles}$$



$$\frac{\sin \theta}{4} = \frac{\sin(140)}{9.42}$$

$$\theta \approx 15.84^\circ$$

W 4.16° S

2. Find the resultant magnitude & direction for the following headings.

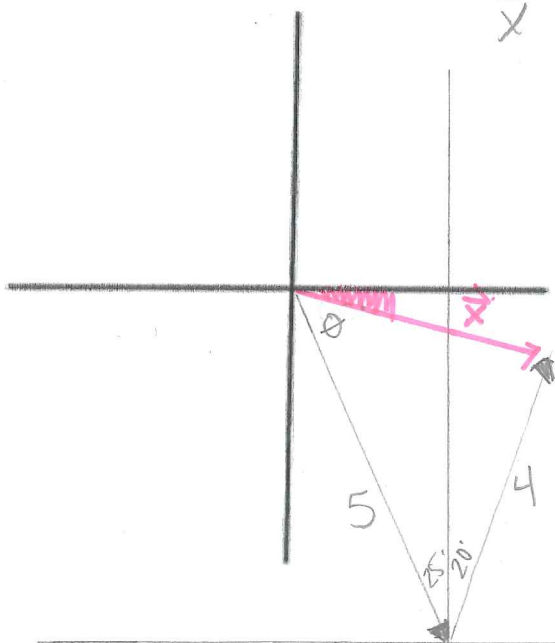
Heading of E 65° S for 5 knots then N 25° E for 4 knots.

$$\vec{x}^2 = 5^2 + 4^2 - 2 \cdot 5 \cdot 4 \cdot \cos(45)$$

$$|\vec{x}| \approx 3.57 \text{ knots}$$

$$\frac{\sin \theta}{4} = \frac{\sin(45)}{3.57}$$

$$\theta = 56.37^\circ$$



E 8.63° S

3. Find the resultant magnitude & direction for the following headings.

Heading of E 60° S for 10 m/s then W 15° N for 6 m/s.

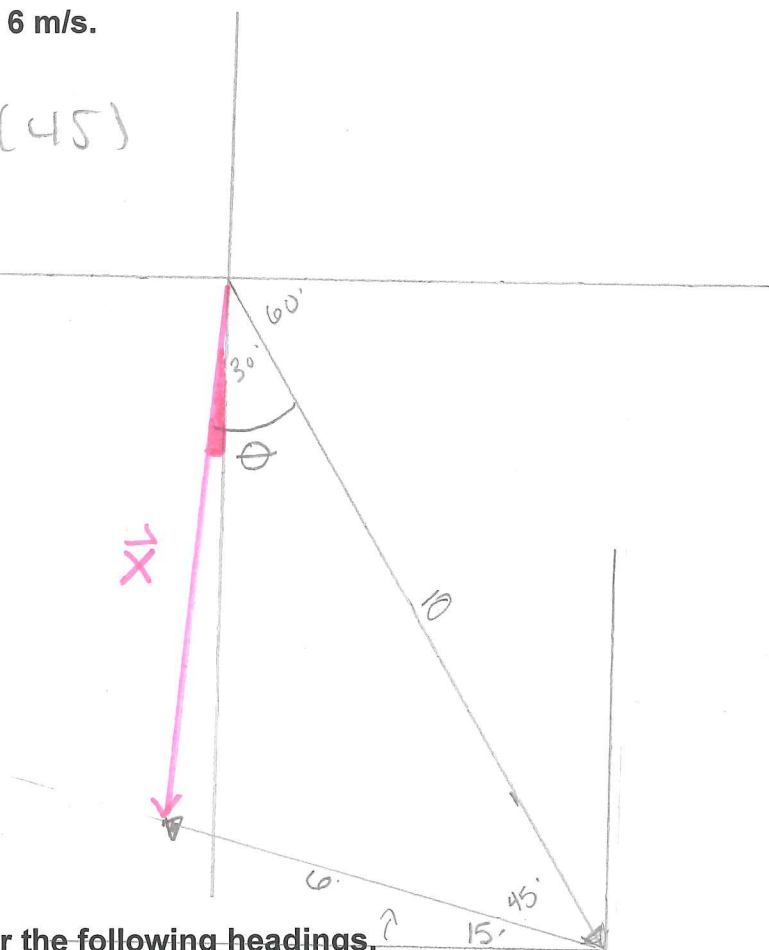
$$|\vec{X}|^2 = 10^2 + 6^2 - 2 \cdot 10 \cdot 6 \cos(45^\circ)$$

$$|\vec{X}| \approx 7.15 \text{ m/s}$$

$$\frac{\sin \theta}{6} = \frac{\sin(45^\circ)}{7.15}$$

$$\theta \approx 36.40^\circ$$

$$\text{S } 6.4^\circ \text{ W}$$



4. Find the resultant magnitude & direction for the following headings.

Heading of W 30° S for 3 miles then N 20° E for 7 miles.

$$|\vec{X}|^2 = 7^2 + 3^2 - 2 \cdot 7 \cdot 3 \cos(80^\circ)$$

$$|\vec{X}| \approx 7.12 \text{ miles}$$

$$\frac{\sin \theta}{7} = \frac{\sin(80^\circ)}{7.12}$$

$$\theta \approx 75.51^\circ$$

$$\text{W } 45.51^\circ \text{ N}$$

