

Question

The speed is $v = \sqrt{50^2 + 400^2 - 2 \cdot 50 \cdot 400 \cdot \cos 45^\circ} \approx 366$ miles per hour .

Direction:

$$\frac{366}{\sin 45^\circ} = \frac{50}{\sin \alpha} \Rightarrow \sin \alpha = \frac{50 \sin 45^\circ}{366} \Rightarrow \alpha = \arcsin\left(\frac{50 \sin 45^\circ}{366}\right) \approx 5.54^\circ \text{ north of east.}$$

Answer: speed is nearly 366 miles per hour and direction is 5.54 degree north if east.