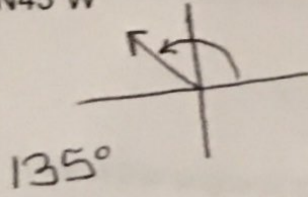


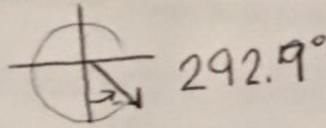
Name: Key

For each of the following, draw a picture and write the angle in standard form

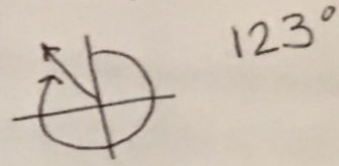
1.) N45°W



2.) S22.7°E



3.) Bearing 327°



Given the standard form, draw the picture and fill in the blank

4.) $22.7^\circ \rightarrow$ Bearing 67.3°

5.) $213.45^\circ \rightarrow$ S 56.55° W

6.) $97.4^\circ \rightarrow$ N 7.4° W

7.) $316.58^\circ \rightarrow$ Bearing 133.42°

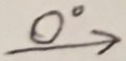
Use the equation that writes a vector in terms of magnitude (speed) and direction to write a vector for each of the following. Write exact if possible and approximate to the nearest hundredths

$$v = \|v\|(\cos\theta i + \sin\theta j)$$

8.) A plane heading 32° west of north at a speed of 536 mph.

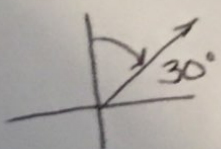
$$V = -284.04 i + 454.55 j$$

9.) A car heading directly east at a speed of 68 mph



$$V = 68 i$$

10.) A plane bearing 60° at a speed 328 mph



$$\begin{aligned} V &= 328 \cos 30^\circ i + 328 \sin 30^\circ j \\ &= 328 \frac{\sqrt{3}}{2} i + 328 \left(\frac{1}{2}\right) j \\ V &= 164\sqrt{3} i + 164 j \end{aligned}$$

11.) A Jumbo jet maintains an airspeed of 550 mph in a southwesterly direction. The velocity of the jet stream is a constant 80 mph from the west. Find the actual speed and direction.

a) What angle is the jet flying from standard position?

$$\theta = 225^\circ$$

b) Write the vector that represents the magnitude and direction of the jet. (exact numbers)

$$V_j = 550 \cos 225^\circ i + 550 \sin 225^\circ j$$

$$= -275\sqrt{2} i - 275\sqrt{2} j$$

c) What is the angle of the wind from standard position?

$$\theta = 0^\circ$$

d) Write the vector that represents the magnitude and direction of the wind. (exact numbers)

$$V_w = 80 \cos 0^\circ i + 80 \sin 0^\circ j$$

$$V_w = 80i$$

e) Find the vector that represents the magnitude and direction of the jet and the wind combined

$$V_j + w = (-275\sqrt{2} + 80)i + (-275\sqrt{2})j$$

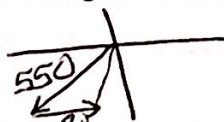
\downarrow store x store y

f) Find the speed of the jet and wind combined (speed is magnitude) round to three places

$$\|V_j + V_w\| = \sqrt{x^2 + y^2} = 496.66 \text{ mph}$$

g) Find the direction of the jet & wind combined, this is the actual direction the aircraft will be.

Draw the picture of your angles, round to three places



$$\tan \theta = \frac{y}{x} \text{ stored values}$$

$$\theta = 51.540^\circ + 180 =$$

$$\theta = \underline{\underline{231.540^\circ}}$$

h) What direction is the jet actually flying?

$$S 38.46^\circ W$$

12.) Burt and Ernie meet up to fly a toy helicopter. At full power it can fly 100 km per hour in calm air. Burt has the controls and he makes the helicopter take off heading $N45^\circ E$. After he feels comfortable he turns on full power. A steady wind begins to blow from the north to the south at a speed of 32 km per hour. In what direction and what speed is the helicopter flying now?

Speed 80.61 km/hw
 Direction 28.699° Standard
 $N61.301^\circ E$

13.) A ship is traveling at a speed of 60 mph with a bearing of 60° on the river with negligible water velocity. When the ship reaches a certain point, it encounters water flow with a velocity of 10 mph in the direction $S45^\circ E$. What are the resultant speed and direction of the ship?

Speed 63.329 mph
 direction 21.227° Standard
 or 68.773 bearing
 or $N68.773^\circ E$

Find each point based on the parametric equations

14.) $x = |t - 3|$ and $y = \frac{1}{2t}$

a) $t = -8$ b) $t = \frac{1}{2}$

a) $(11, -\frac{1}{16})$ b) $(-\frac{5}{2}, 1)$

15.) $x = t^2 + 5t$ and $y = 3 - t^2$

a) $t = -1$ b) $t = 0$

a) $(-4, 2)$ b) $(0, 3)$

16.) $x(t) = \frac{2}{t}$

$y(t) = 6t + 1$

$y = \frac{18}{x} + 1$

17.) $x(t) = \sqrt{t}$

$y(t) = \sqrt{4 - t}$

$y = \sqrt{4 - x^2}$

Convert the parametric equations to rectangular form

18.) $x(t) = 8 - t$

$y(t) = t^2 + 10t - 100$

$t = 8 - x$

$y(t) = (8 - x)^2 + 10(8 - x) - 100$

$y = x^2 - 26x + 44$

19.)

$x(t) = 2 + 5\sec(t)$

$y(t) = 1 + 3\tan(t)$

$\sec t = \frac{x-2}{5}$ $\tan t = \frac{y-1}{3}$

$\frac{(x-2)^2}{25} - \frac{(y-1)^2}{9} = 1$