#1 Points possible: 1. Total attempts: 2

A pilot is flying over a straight highway. He determines the angles of depression to two mileposts, 4.6 mi apart, to be 38° and 44°, as shown in the figure.

![Diagram](image)

NOTE: The picture is NOT drawn to scale.

Find the distance of the plane from point A.

\[ \text{distance from } A = \text{mi} \]

Find the elevation of the plane.

\[ \text{height} = \text{mi} \]

Enter your answer as a number; your answer should be accurate to 2 decimal places.

3.227 miles

1.987 miles

3.22683180946361.9866360324421

#2 Points possible: 1. Total attempts: 2

A pilot flies in a straight path for 1 h 30 min. She then makes a course correction, heading 10° to the right of her original course, and flies 2 h in the new direction. If she maintains a constant speed of 685 mi/h, how far is she from her starting position?

\[ \text{Your answer is } \text{mi}; \]

Enter your answer rounded to two decimal places.

2388.5633249807

#3 Points possible: 1. Total attempts: 2

To find the distance across a small lake, a surveyor has taken the measurements shown. Find the distance across the lake using this information.

![Diagram](image)

\[ \text{distance} = \text{mi} \]

Enter your answer as a number; your answer should be accurate to 2 decimal places.

1.8183477699586

1.818 miles
The path of a satellite orbiting the earth causes it to pass directly over two tracking stations A and B, which are 74 km apart. When the satellite is on one side of the two stations, the angles of elevation at A and B are measured to be 86.3° and 83.9°, respectively.

How far is the satellite from station A?
Distance from A = \( \text{km} \)

How high is the satellite above the ground?
Height = \( \text{km} \)

Enter your answer as a number; your answer should be accurate to 2 decimal places.

To estimate the height of a building, two students find the angle of elevation from a point (at ground level) down the street from the building to the top of the building is \( \alpha \). From a point that is 400 feet closer to the building, the angle of elevation (at ground level) to the top of the building is \( \beta \). From a point that is \( d \) feet from the building, the angle of elevation from a point (at ground level) down the street from the building to the top of the building is \( \gamma \).

How far is the satellite from station A?

Distance from A = \( \text{km} \)

How far is the satellite from station B?

Distance from B = \( \text{km} \)

Find the area of this quadrilateral.
Area = \( \text{yd}^2 \)

Convert the polar coordinate \((r, \theta)\) to Cartesian coordinates.
x = \( \text{ } \)
y = \( \text{ } \)

Convert the Cartesian coordinate \((x, y)\) to polar coordinates.
r = \( \text{ } \)
\( \theta = \text{ } \)

Rewrite the polar equation \(r = \text{expression} \) as a Cartesian equation.

\[ r = \text{expression} \]

The height of the building is \( \text{feet} \).

How high is the satellite above the ground?
Height = \( \text{km} \)

How far is the satellite from station A?
Distance from A = \( \text{km} \)

How far is the satellite from station B?
Distance from B = \( \text{km} \)

Convert the polar coordinate \((r, \theta)\) to Cartesian coordinates.
x = \( \text{ } \)
y = \( \text{ } \)

Convert the Cartesian coordinate \((x, y)\) to polar coordinates.
r = \( \text{ } \)
\( \theta = \text{ } \)

Rewrite the polar equation \(r = \text{expression} \) as a Cartesian equation.

\[ r = \text{expression} \]
4. Rewrite the Cartesian equation as a polar equation. Enter \( \theta \) for \( \theta \) if needed.

5. Write the vector shown below as a combination of vectors and shown above.

6. The plane's speed relative to the ground will be \( \text{km/hr} \) degrees off course.

7. Find the net force on the object (the sum of the forces).

8. Find the component of the force west of \( \text{km/hr} \).

9. Resolve the Cartesian equation into its component form.
Two children are throwing a ball back-and-forth straight across the back seat of a car. The ball is being thrown 8 mph relative to the car, and the car is travelling 25 mph down the road. If one child doesn't catch the ball and it flies out the window, in what direction does the ball fly (ignoring wind resistance)?

The Cartesian equation can be written as:

\[ y = \frac{8}{25} x \]

Eliminate the parameter to find a Cartesian equation in the form \( y = \frac{8}{25} x \).

Eliminate the parameter to obtain an equation for \( y \) as a function of \( x \).

The Cartesian equation is

\[ y = \frac{8}{25} x \]

Given the parametric equations below, eliminate the parameter \( t \) to obtain an equation in the form \( y = \frac{8}{25} x \): a.

The resulting equation can be written as

\[ y = \frac{8}{25} x \]

Match equation graph with its parametric equation. Not all equations will be used. All graphs shown

d. If one child doesn't catch the ball and it flies out the window, in what direction does the ball fly?

The Cartesian equation is

\[ y = \frac{8}{25} x \]

Eliminate the parameter to find a simplified Cartesian equation of the form \( y = \frac{8}{25} x \).

If one child doesn't catch the ball and it flies out the window, in what direction does the ball fly?
The graph below can be represented by parametric equations of the form
\[ x(t) = a + bt, \quad y(t) = c + dt. \]

The ellipse can be drawn with parametric equations where \( r(t) \) is written in the form
\[ x(t) = f(t), \quad y(t) = g(t). \]

Suppose parametric equations for the line segment between \( P \) and \( Q \) have the form:
\[ x = at + b, \quad y = ct + d. \]

IF the parametric curve starts at \( P \) when \( t = 0 \) and ends at \( Q \) when \( t = 1 \), then find \( a, b, c, \) and \( d \).

Support parametric equations for the line segment between \( P \) and \( Q \) have the form:
\[ x = at + b, \quad y = ct + d. \]
The plot above is created with the parametric equations

\[
\begin{align*}
\begin{cases}
\theta(t) &= t - 3.5 \\
\rho(t) &= t^2 - 7.5t + 10
\end{cases}
\end{align*}
\]

To achieve this graph, \( \theta \) and \( \rho \) are both whole numbers from 1 to 3.

What must we have for \( \theta \) and \( \rho \)?

The plot above is created with the parametric equations.

\[
\begin{align*}
\begin{cases}
\theta(t) &= t - 3.5 \\
\rho(t) &= t^2 - 7.5t + 10
\end{cases}
\end{align*}
\]