Math Problem Set 6

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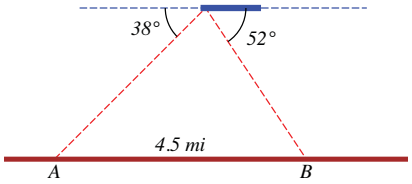
#1 Points possible: 1. Total attempts: 2

A pilot is flying over a straight highway. He determines the angles of depression to two mileposts, 4.5 mi apart, to be 38° and 52°, as shown in the figure.



NOTE: The picture is NOT drawn to scale.

Find the distance of the plane from point *A*.
distance from *A* = _____ mi
Find the elevation of the plane.
height = _____ mi

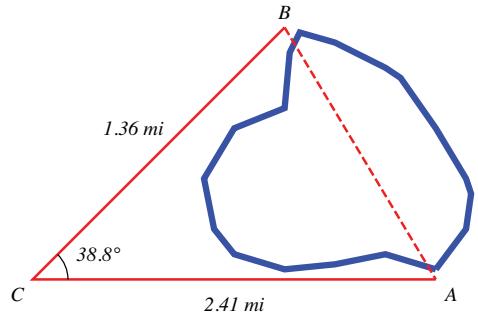
Enter your answer as a number; your answer should be accurate to 2 decimal places.
3.546
2.183

#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 degrees to the right of her original course, and flies 2 h in the new direction. If she maintains a constant speed of 625 mi/h, how far is she from her starting position?
Your answer is _____ mi;
Enter your answer rounded to two decimal places.
2179.35

#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.



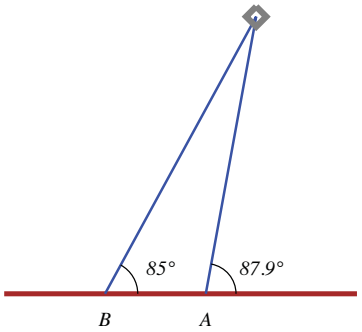
NOTE: The triangle is NOT drawn to scale.

distance = _____

Enter your answer as a number; your answer should be accurate to 2 decimal places.
1.597

#4 Points possible: 1. Total attempts: 2

The path of a satellite orbiting the earth causes it to pass directly over two tracking stations A and B, which are 52 mi apart. When the satellite is on one side of the two stations, the angles of elevation at A and B are measured to be 87.9° and 85°, respectively.



NOTE: The picture is NOT drawn to scale.

How far is the satellite from station A?
distance from A = _____ mi
How high is the satellite above the ground?
height = _____ mi

Enter your answer as a number; your answer should be accurate to 2 decimal places.
1023.9
1023.212

#5 Points possible: 1. Total attempts: 2

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 36˚. From a point that is 150 feet closer to the building, the angle of elevation (at ground level) to the top of the building is 59˚. If we assume that the street is level, use this information to estimate the height of the building.

The height of the building is _____ feet.
193.42

#6 Points possible: 1. Total attempts: 2

The four sequential sides of a quadrilateral have lengths a = 4.4, b = 7.7, c = 9.1, and d = 10.4 (all measured in yards). The angle between the two smallest sides is α = 94°.

What is the area of this figure?
area = _____ yd²
55.83

#7 Points possible: 1. Total attempts: 2

Convert the polar coordinate $\left(7, \frac{\pi}{3}\right)$ to Cartesian coordinates.

Enter exact values.

x = _____

y = _____
3.5
6.0621778264911

#8 Points possible: 1. Total attempts: 2

Convert the Cartesian coordinate (-5,-4) to polar coordinates, $0 \le \theta < 2\pi$

r = _____
Enter exact value.

θ = _____
6.4031242374328
3.8163335958133

#9 Points possible: 1. Total attempts: 2

Rewrite the polar equation $r = 6 \sin(\theta)$ as a Cartesian **equation**.

_____
$x^2 + y^2 = 6 \cdot y$

#10 Points possible: 1. Total attempts: 2

Rewrite the Cartesian equation $y = 3x^2$ as a polar equation.

$r(\theta) =$ _____

Enter **theta** for θ if needed.

$$\frac{\sin(\theta)}{3 \cdot (\cos(\theta))^2}$$

#11 Points possible: 1. Total attempts: 2

An airplane is heading north at an airspeed of 700 km/hr, but there is a wind blowing from the northeast at 40 km/hr.

The plane will end up flying _____ degrees off course

The plane's speed relative to the ground will be _____ km/hr

2.41
672.31

#12 Points possible: 1. Total attempts: 2

An airplane needs to head due north, but there is a wind blowing from the northeast at 40 km/hr. The plane flies at an airspeed of 650 km/hr,

To end up due north, the pilot will need to fly the plane _____ degrees east of north

2.49

#13 Points possible: 1. Total attempts: 2

Given the parametric equations below, eliminate the parameter t to obtain an equation for y as a function of x

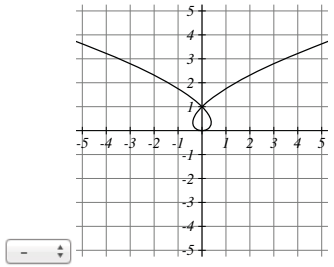
$$\begin{cases} x(t) = 6\sqrt{t} \\ y(t) = 5t + 2 \end{cases}$$

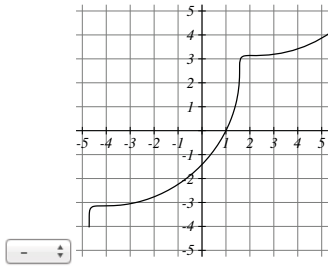
$y(x) =$ _____

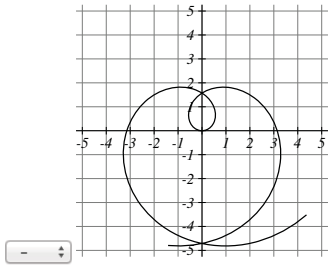
$$5\left(\frac{x}{6}\right)^2 + 2$$

#14

Match equation graph with its parametric equation. Not all equations will be used. All graphs shown for $-5 \le t \le 5$. You may use a graphing calculator or Desmos.







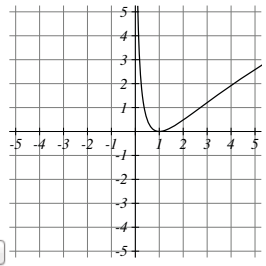
a. $\begin{cases} x(t) = e^t \\ y(t) = t^2 \end{cases}$

b. $\begin{cases} x(t) = t + \cos(t) \\ y(t) = t + \sin(t) \end{cases}$

c. $\begin{cases} x(t) = t^3 - t \\ y(t) = t^2 \end{cases}$

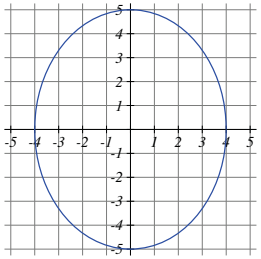
d. $\begin{cases} x(t) = t\cos(t) \\ y(t) = t\sin(t) \end{cases}$

e. $\begin{cases} x(t) = t^3 \\ y(t) = t^2 \end{cases}$



c b d a

#15 Points possible: 1. Total attempts: 2



The graph below can be represented by parametric equations of the form

$$\begin{cases} x(t) = a\cos(t) \\ y(t) = b\sin(t) \end{cases}$$

Where a = ____ and b = ____. You may use a graphing calculator or Desmos.

4

5

#16 Points possible: 1. Total attempts: 2

The ellipse $\frac{x^2}{6^2} + \frac{y^2}{7^2} = 1$ can be drawn with parametric equations where $x(t)$ is written in the form

$x(t) = r\cos(t)$ with $r =$ _____

and y(t) = _____

6

$7 \cdot \sin(t)$
