HW #1: Precalc Review (6367116)

Current Score: 0/65   **Due:**   Thu Oct 2 2014 11:59 PM PDT

Question	1	2	3	4	5	6	7	Total
Points	0/8	0/16	0/10	0/9	0/16	0/5	0/1	0/65

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1.   0/8 points   circletangentlines2 [1229844]   ‗

Consider the circle of radius 10 centered at the origin. Provide answers accurate to two decimal places.

(a) The equation of the tangent line to the circle through the point (-6,8) has equation
$y=$ ☐ $x +$ ☐ .
(b) Suppose that L is a tangent line to this circle which is parallel to the line $y=5x+7$ and has a negative y intercept. Then the point of tangency of L with this circle is (☐ , ☐).

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2.   0/16 points   circletangentlines1rand [1228908]   ‗

Draw the unit circle and plot the point $P=(3,2)$. Observe there are TWO lines tangent to the circle passing through the point P. Answer the questions below with 3 decimal places of accuracy.
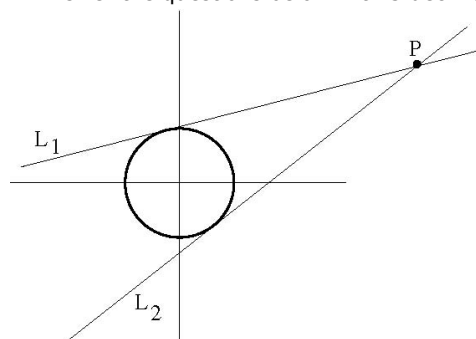
(a) The line L_1 is tangent to the unit circle at the point
(☐ , ☐).

(b) The tangent line L_1 has equation:
$y=$ ☐ $x +$ ☐ .

(c) The line L_2 is tangent to the unit circle at the point (☐ , ☐).

(d) The tangent line L_2 has equation:
$y=$ ☐ $x +$ ☐ .

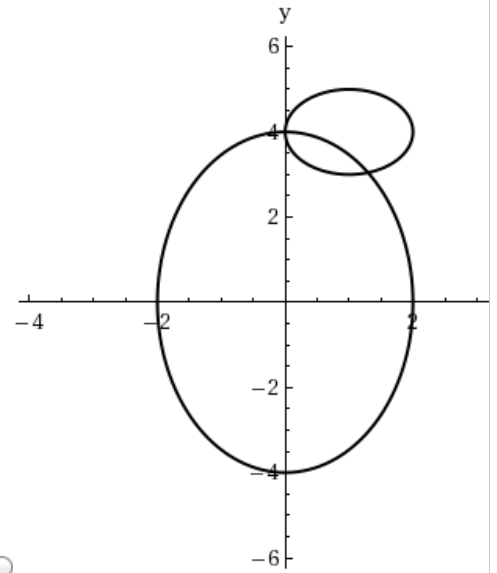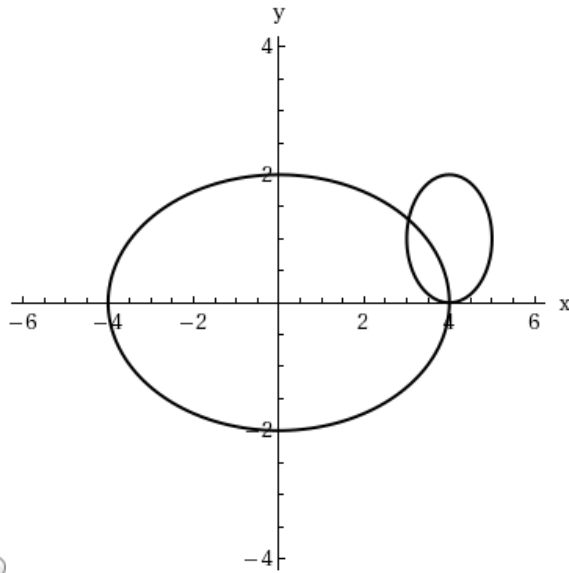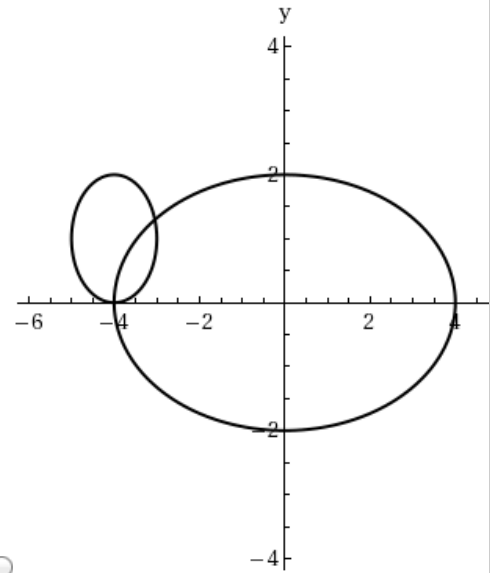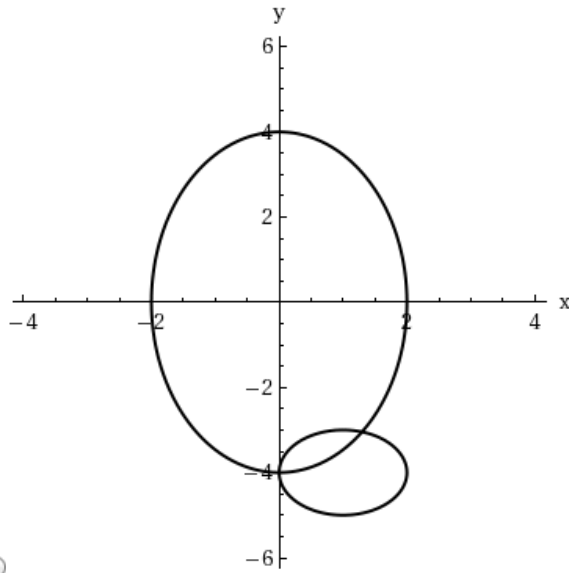**3.**   0/10 points   SCalcET7 10.1.045. [1889057]   ‗

Suppose that the position of one particle at time t is given by

$$x_1 = 4\sin t, \quad y_1 = 2\cos t, \quad 0 \le t \le 2\pi$$

and the position of a second particle is given by

$$x_2 = -4 + \cos t, \quad y_2 = 1 + \sin t, \quad 0 \le t \le 2\pi.$$

(a) Graph the paths of both particles.

How many points of intersection are there?

[   ] points of intersection

(b) Are any of these points of intersection *collision points*? In other words, are the particles ever at the same place at the same time?

○ Yes

○ No

If so, find the collision points. (Enter you answers as a comma-separated list of ordered pairs. If an answer does not exist, enter DNE.)

(c) If the *x*-coordinate of the second particle is given by $x_2 = 4 + \cos t$ instead, is there still a collision?

○ Yes

○ No

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4.   0/9 points   SCalcET7 10.1.032. [1889003]   ▫

The parametric equations

$$x = x_1 + (x_2 - x_1)t, \quad y = y_1 + (y_2 - y_1)t$$

where $0 \le t \le 1$ describe the line segment that joins the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$.

Use a graphing device to draw the triangle with vertices $A(1, 1)$, $B(4, 4)$, $C(1, 6)$. Find the parametrization, including endpoints, and sketch to check. (Enter your answers as a comma-separated list of equations. Let x and y be in terms of t.)

*A to B*

B to C

A to C

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5.   0/16 points   antspiderparametric [2551883]   ▫

An ant is moving around the unit circle in the plane so that its location is given by the parametric equations *(cos(π t), sin(π t))*. Assume the distance units in the plane are "feet" and the time units are "seconds". In particular, the ant is initially at the point A=(1,0). A spider is located at the point S=(10,0) on the *x*-axis. The spider plans to move along the tangential line pictured at a constant rate. Assume the spider starts moving at the same time as the ant. Finally, assume that the spider catches the ant at the tangency point P the second time the ant reaches P.
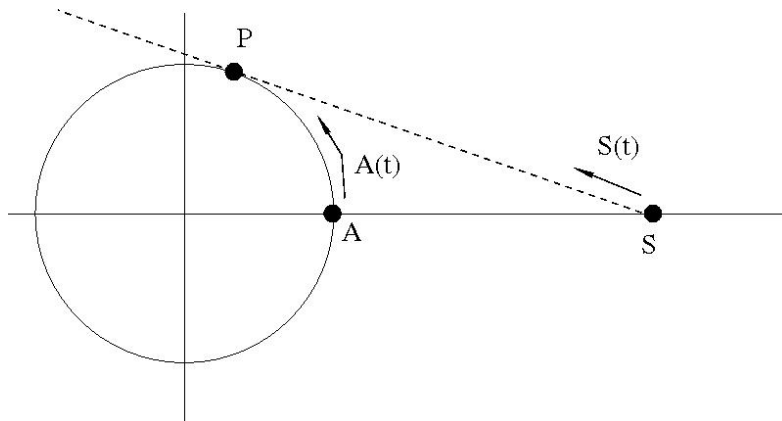
(a) The coordinates of the tangency point $P=($ _____ , _____).

(b) The FIRST time the ant reaches *P* is _____ seconds.

(c) The SECOND time the ant reaches *P* is _____ seconds.

(d) The parametric equations for the motion of the spider are:

x(t)= _____ t + _____ ;

y(t)= _____ t + _____ .

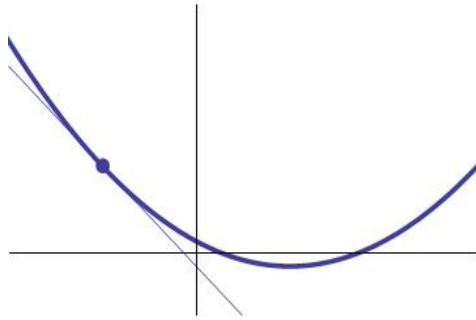**6.**   0/5 points   parabolaTL2 [2689929]   _

The graph of the quadratic function $y = 2x^2 - 4x + 1$ is pictured below, along with the point P=(-1,7) on the parabola and the tangent line through P. A line that is tangent to a parabola does not intersect the parabola at any other point. We can use this fact to find the equation of the tangent line.

(a) If m is the slope of the tangent line, then using the slope/point formula, the equation of the tangent line will be:

y = m(x- _____) + _____

(b) The values of x for which the point (x,y) lies on both the line and the parabola satisfy the quadratic equation:

$2x^2 + bx + c = 0$

where b= _____ and c= _____ (b and c should depend on m).

(c) For most values of m, the quadratic equation in part (b) has two solutions or no solutions. The value of m for which the quadratic equation has exactly one solution is the slope of the tangent line. This value is $m =$

_____ .

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7.   0/1 points   SCalcET7 2.1.JIT.006.MI. [1779313]   _

Find a function whose graph is a parabola with vertex $(1, -4)$ and that passes through the point $(2, 1)$.

$f(x) =$ _____

Assignment Details