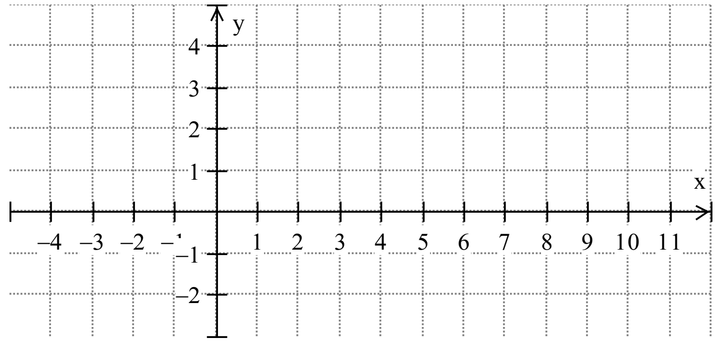
Math 253 Sum 2014 Test #1 Practice Helfenstein Name

1) Consider the parametric equations: $x = t^2 - 4t$, $y = 3 - t$, $-2 \le t \le 5$

(a) Sketch the graph given by the parametric equations. Be sure to include the direction of the graph.

(b) Eliminate the parameter 't' to find the Cartesian equation for the curve.



(c) Find the equation of the tangent line at t = 0.

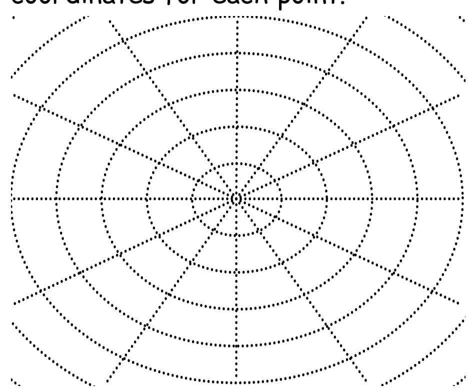
(d) Find the area between the curve and the y-axis.

(e) Write the integral for length of the curve for $0 \le t \le 2$. Use tables to evaluate that integral.

2) Find the equation of the line of the form $x(t) = x_0 + \Delta x\, t$, $y(t) = y_0 + \Delta y\, t$ that passes through the pt (-3, 2) at t=0 and the pt (7, -6) at t = 2.

3) Plot the following polar coordinates and then find two more sets of polar coordinates for each point.

(a) $(2, \pi/3)_{r\theta}$ (b) $(-1, \pi/4)_{r\theta}$



(c) Convert to polar coordinates: $(-3, 4)_{xy}$

(d) Convert to rectangular coordinates: $(5, 7\pi/6)$

4) Consider the polar equation $r = 4\cos(3\theta)$. (a) On the interval $[0, \pi]$ at what θ-value(s) is r = 0?

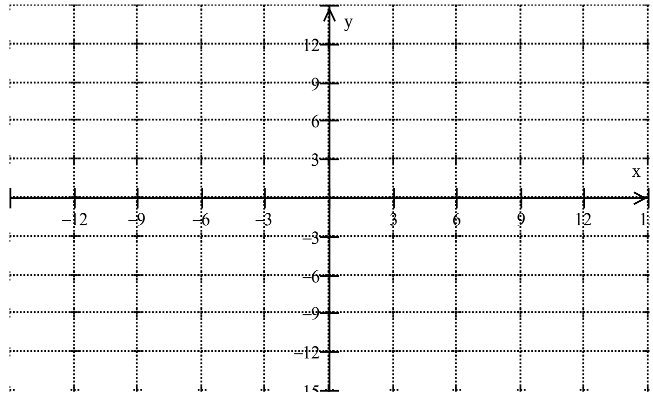
(b) Find dy/dx @ $\theta = \pi/6$

(c) What is the slope of the tangent line(s) at the pole (origin)?

(d) Find the area of one petal of the curve.

Find the equation of each conic section and then sketch its graph.

5) Ellipse, foci (±5, 0), vertices (±13, 0)



6) Hyperbola, vertices (0, ±2), foci (0, ±5)

7) Parabola, focus (4, 1), vertex (2, 1).

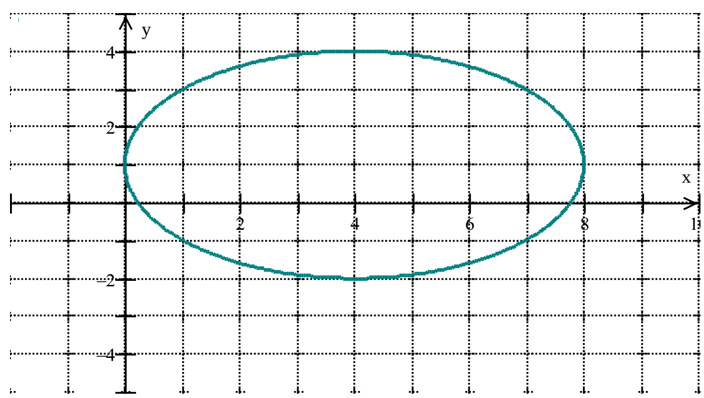
8) Find the equation of these parabolas:

(a) The parabola with a vertex at (-4, 3) and a root at x = 6.

(b) The parabola with y-intercepts at y = -5, y = 7 and an x-intercept of 4.

(c) A parabola that passes through the origin (& vertex) at t = 0 and then through (10, 4) at t = 1. There are many possible answers.

9) Find the equation of the ellipse.



10) Find the area of the region that lies inside both r= 2 + sin(θ) and r = 2 – sin(θ).