Warm-up:

1. Trigonometry review:
   (a) Draw two reference triangles, $30-60-90$ and $45-45-90$, and label side lengths and angles in radians.
   (b) What are $\cos(\pi/4)$, $\cos(\pi/6)$, $\sin(\pi/6)$, $\tan(\pi/3)$ and $\tan(\pi/4)$?
   (c) What are $\cos(5\pi/6)$, $\cos(7\pi/6)$, and $\tan(11\pi/6)$?
   (d) Find all angles θ with $\cos(\theta) = 1/2$.
   (e) Find all angles θ with $\sin(\theta) = \frac{-1}{\sqrt{3}}$.
   (f) Sketch the graph in the r, θ plane of $r = \sin(2\theta)$.
   (g) Sketch the graph in the r, θ plane of $r = 5 - 2\sin(\theta)$.

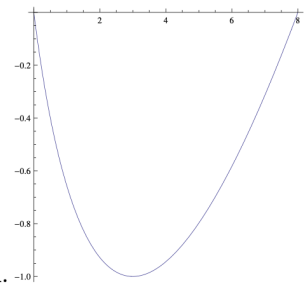
Problems:

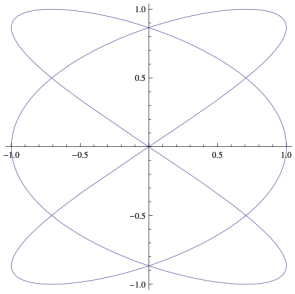
1. Let
$$x = \frac{1-t^2}{1+t^2}, \qquad y = \frac{2t}{1+t^2}.$$
   (a) Sketch this as t increases from -2 to 2.
   (b) What happens to x and y as $t \to \infty$. What about as $t \to -\infty$.
   (c) show that this parametric curve traces out the circle $x^2 + y^2 = 1$.
   (d) Compute dy/dx for this curve, first by using $x^2 + y^2 = 1$, then using the parametric equations.
   (e) Find an equation for the tangent line to the curve at $t = 2$.
2. Sketch the following parametric curves:
   (a) $x = \sin(4\theta)$, $y = \cos(4\theta)$, $0 \le \theta \le \pi/2$
   (b) $x = 2^t - t$, $y = 2^{-t} + t$, $-3 \le t \le 3$
   (c) $x = \cos^2(t)$, $y = 1 + \cos(t)$, $0 \le t \le \pi$

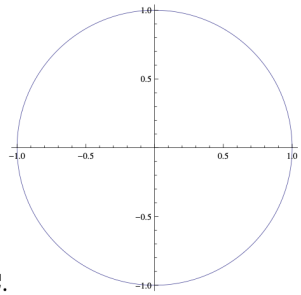
3. Match the following parametric equations to their graphs

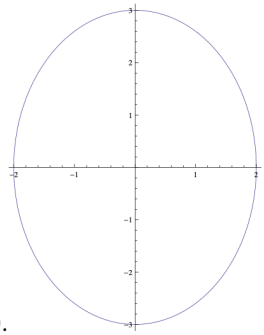
$x = \cos(t),\ y = \sin(t),\ 0 \le t \le \pi$	$x = \cos(3t),\ y = \sin(2t),\ 0 \le t \le 2\pi$	$x = t^2,\ y = t^5,\ -1 \le t \le 1$
$x = \cos(2t),\ y = \sin(2t),\ 0 \le t \le \pi$	$x = t + \cos(2t),\ y = t + \sin(2t),\ 0 \le t \le \pi$	$x = t^5,\ y = t^2,\ -1 \le t \le 1$
$x = 3\cos(t),\ y = 2\sin(t),\ 0 \le t \le 2\pi$	$x = 2\cos^2(t),\ y = 3\sin^2(t),\ 0 \le t \le 2\pi$	$x = t^2 - t,\ y = t^2 + t,\ 0 \le t \le 2$
$x = 2\cos(t),\ y = 3\sin(t),\ 0 \le t \le 2\pi$	$x = 1 - \sin(t),\ y = \cos^2(t),\ 0 \le t \le 2\pi$	$x = t^3 + t^2 - t,\ y = t^2 - t^4,\ -1 \le t \le 1$

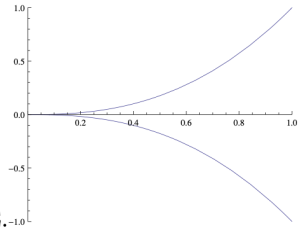
Graphs:

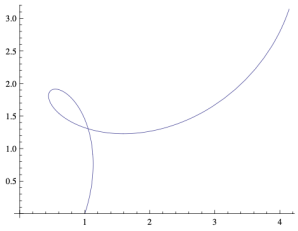
A. 

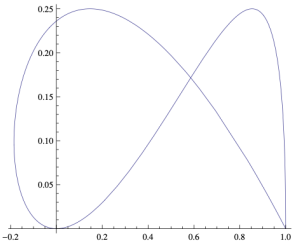
B. 

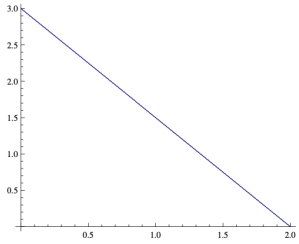
C. 

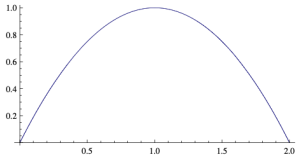
D. 

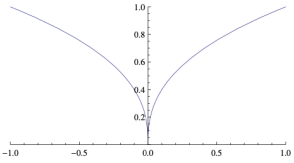
E. 

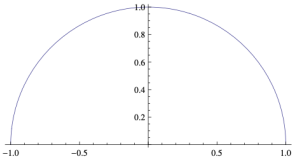
F. 

G. 

H. 

I. 

J. 

K. 

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