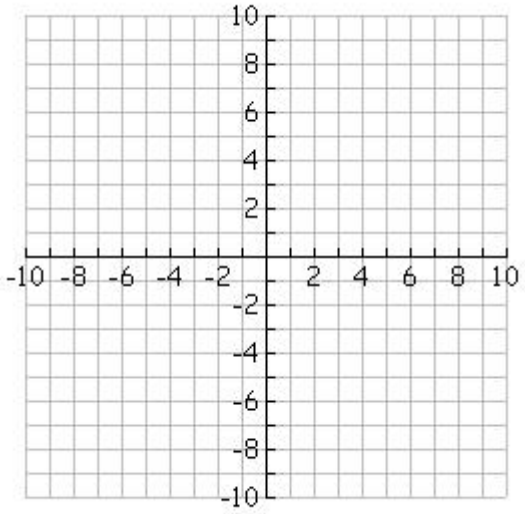
Trigonometry Name _____ PD _____

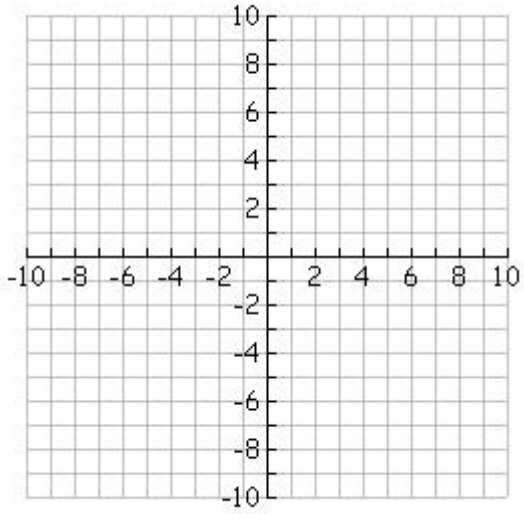
Parametric Equations/Projectile Motion Worksheet

A particle moves in the x-y plane according to the following parametric equations. Sketch the path the particle follows, then eliminate the parameter.

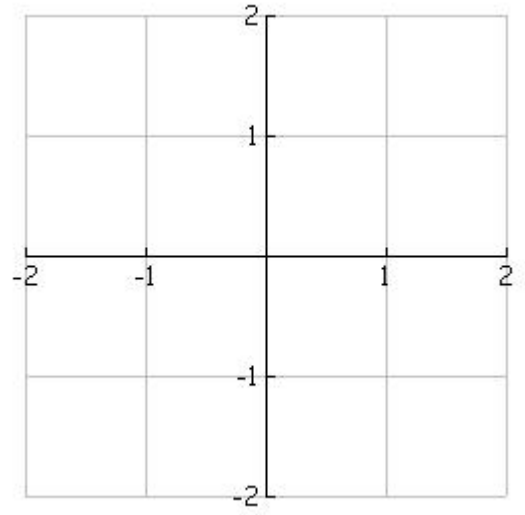
1. $x = 3t + 2, \quad y = t + 1; \quad -4 \le t \le 2$



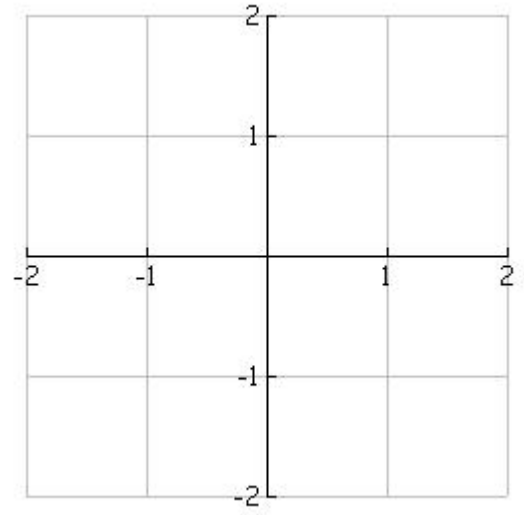
2. $x = 2\cos t, \quad y = 3\sin t; \quad 0 \le t \le 2\pi$



3. $x = \sec t, \quad y = \tan t; \quad -\frac{\pi}{3} \le t \le \frac{\pi}{3}$



4. $x = \sin^2 t, \quad y = \cos^2 t; \quad 0 \le t \le \frac{\pi}{2}$



5. Bob throws a ball straight up with an initial velocity of 50 feet per second from a height of 6 feet.

   a) Find parametric equations that describe the motion of the ball as a function of time.

   b) How long is the ball in the air?

6. Steve throws a baseball with an initial speed of 145 feet per second at an angle of 20° to the horizontal. The ball leaves Steve's hand at a height of 5 feet.

   a) Find parametric equations that describe the motion of the ball as a function of time.

   b) How long is the ball in the air?

   c) What is the horizontal distance the ball traveled?

   d) Use your calculator to help you determine the maximum height of the ball.