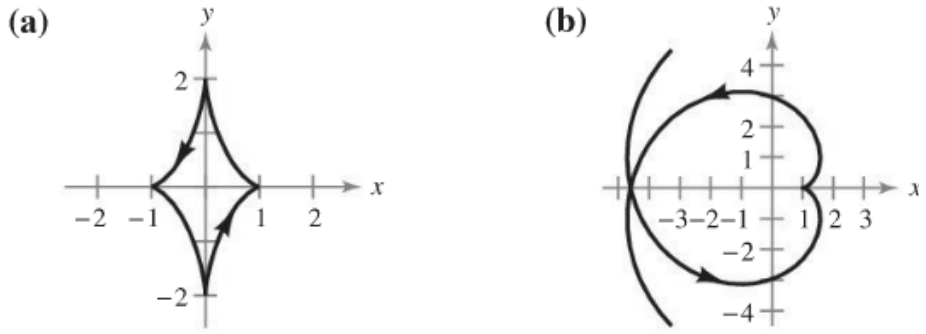
§10.2 # WrittenHW #5 TMath 126

1. [4] Match each set of parametric equations with the correct graph. Justify yourself. Try to use only the technology you can use during exams!



i) $x(t) = \cos^3(t)$ and $y(t) = 2\sin^3(t)$ ii) $x(t) = \cos(t) + t\sin(t)$ and $y(t) = \sin(t) - t\cos(t)$.

2. Consider the parametric equations $x(t) = \ln(2t)$ and $y(t) = t^2$.
   (a) [2] Sketch the plane curve of the parametric equations.
   (b) [3] Eliminate the parameter and write the corresponding "rectangular equation".

3. [6] Find two different sets of parametric equations for the rectangular equation $y = \dfrac{4}{x-1}$.

10.3 # WrittenHW #5 TMath 126

1. Consider the parametric equations $x(t) = t(t-1)$ and $y(t) = t^3 - 3t - 1$.

   (a) [2] Find *where* the parametric equations cross themselves.

   (b) [4] Find the equation of the tangent lines(s) at the point where the curve crosses itself.

2. In the local baseball field the center field fence is 10 feet high and 400 feet from home plate. The pall is hit 3 feet above the ground and leaves the bat at an angle of θ degrees with the horizontal at the speed of $\frac{440}{3}$ feet/sec. Find the minimum angle at which the ball must leave the bat in order for the hit to be a home run.

   (a) [2] Use technology to "experimentally" find the answer to the above question.

   (b) [3] Outline the calculus and algebra steps (not guess-and-check!) one could use to find the answer to this question.

   (c) [4] Follow your steps from part b and find the exact answer.