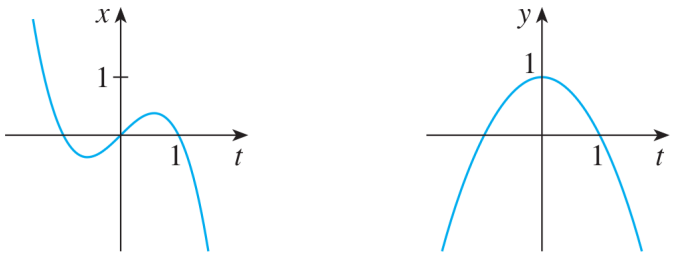
MAC2312: Calculus 2 - Section 3

Test 3 Review July 15, 2015

1. Use the graphs of $x = f(t)$ and $y = g(t)$ to sketch the parametric curve with equations $x = f(t)$, $y = g(t)$. Indicate with arrows the direction in which the curve is traced as t increases.



2. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for the parametric curve $x = 2\sin t$, $y = 3\cos t$.
3. Find the area of the ellipse $x = a\cos\theta$, $y = b\sin\theta$.
4. Set up an integral that represents the length of the curve $x = t + e^{-t}$, $y = t - e^{-t}$ for $0 \le t \le 2$.
5. Set up an integral that represents the area of the surface obtained by rotating the curve $x = t^2 - t^3$, $y = t + t^4$ for $0 \le t \le 1$ about the x-axis.
6. Set up an integral that represents the area of the region that lies inside the curve $r = 3\cos\theta$ and outside the curve $r = 1 + \cos\theta$.
7. Set up an integral that represents the length of the curve $r = 5^\theta$ for $0 \le \theta \le 2\pi$.
8. Determine whether the sequence $\left\{n^2e^{-n}\right\}_{n=1}^{\infty}$ converges or diverges.
9. Determine whether the series $\displaystyle\sum_{n=1}^{\infty} \frac{1+3^n}{2^n}$ converges or diverges.
10. Suppose that every time a ball falls from a height of h, it rebounds to a height of $\frac{1}{4}h$. If it is dropped from an initial height of 1 meter, find the total distance that it travels.