Review: True or False?
Monday, February 22

Parametric Curves, Polar Coordinates

• The curve defined by any set of parametric equations \((x, y) = (f(t), g(t))\) can also be defined by an equation of the form \(y = h(x)\).

• The curve defined by any equation of the form \(y = h(x)\) can also be defined by a set of parametric equations \((x, y) = (f(t), g(t))\).

• If \(dx/dt = 0\) at some point on a curve then the tangent line at that point is horizontal.

• If \(dy/dt = 0\) and \(dx/dt = 0\) at some point on a curve then the tangent line at that point could be horizontal, vertical, or neither.

• If \(f(\theta) = -f(-\theta)\) for all \(\theta\) then the curve defined by \(r = f(\theta)\) will have a vertical axis of symmetry.

Polar Curves, Vectors

• If \(x = f(t)\) and \(y = g(t)\) are twice differentiable then \(d^2 y/dx^2 = d^2 y/dt^2 / d^2 x/dt^2\).

• The distance traveled by an object is equal to the integral of its velocity over time.

• For any vectors \(u\) and \(v\) in \(\mathbb{R}^n\), \(|u + v| \leq |u| + |v|\).

• For any \(u, v, w \in \mathbb{R}^3\), \(u \times (v \times w) = (u \times v) \times w\).
• For any $u, v \in \mathbb{R}^3$, $u \cdot (v \times u) = 0$.

• For any $u, v \in \mathbb{R}^3$, $v \cdot (u \times u) = 0$.

Lines and Planes

• For any line in $\mathbb{R}^3$ and a point not on that line, there is exactly one plane that contains both the line and the point.

• For any line in $\mathbb{R}^3$ and a point not on that line, there is exactly one plane that is normal to the line and contains the point.

• For any two non-intersecting lines in $\mathbb{R}^3$, there is exactly one plane that contains one line but not the other.

• If there is no solution $t$ to the equation $u_0 + tu = v_0 + tv$ then the lines given by \{ $u_0 + tu : t \in \mathbb{R}$ \} and \{ $v_0 + tv : t \in \mathbb{R}$ \} do not intersect.

• The intersection of a cone and a plane is always an ellipse.

Vector Functions

• If $|r(t)| = 1$ for all $t$, then $|r'(t)|$ is constant.

• Different parametrizations of the same curve result in identical tangent vectors at a given point on the curve.