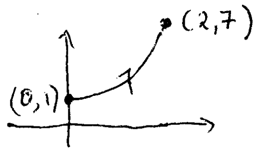
Name: ______________________________

MTH 243 Sec 2 *Quiz 7* *April 14, 2005*

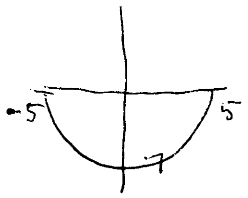
1. Find a parametric representation of the portion of the graph of $y = 1.5x^2 + 1$ from $(0,0)$ to $(2,7)$. (On the xy-plane.)

The point $(0,0)$ is not on the parabola $y = 1.5x^2+1$, so the problem makes no sense. It was supposed to be $(0,1)$ instead of $(0,0)$. With $(0,0)$ replaced by $(0,1)$, a possible parametric representation is:



$x = t$
$y = 1.5t^2 + 1, \quad t \text{ in } [0, 2].$

2. Again on the xy-plane, find a parametrization of the lower hemicircle centered at $(0,0)$ with radius 5. Your parametrization should be such that the curve is covered once in the ccw direction.



$x = 5\cos t$
$y = 5\sin t, \quad t \text{ in } [\pi, 2\pi].$

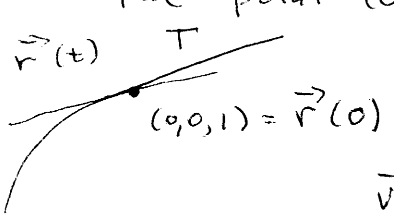
3. Find a parametrization of the line L through $(3, -2, 1)$ and parallel to the vector $\vec{w} = -3\vec{i} - 4\vec{j} - 2\vec{k}$.

L: $x(t) = 3 - 3t$
$y(t) = -2 - 4t$
$z(t) = 1 - 2t, \quad t \text{ in } (-\infty, +\infty).$

In the vector form:
$\vec{r}(t) = (3-3t)\vec{i} + (-2-4t)\vec{j} + (1-2t)\vec{k}$

4. Find a parametric representation of the line tangent to the parametric curve $\vec{r}(t) = t^3\vec{i} + 2t\vec{j} + e^t\vec{k}$, t in $(-\infty, \infty)$, at the point (0,0,1).

The point $(0,0,1)$ belongs to the curve for $t = 0$:



The tangent line, T, passes through $(0,0,1)$ and is parallel to the velocity vector $\vec{v}(0)$.
$\vec{v}(t) = 3t^2\vec{i} + 2\vec{j} + e^t\vec{k}, \quad \vec{v}(0) = 2\vec{j} + \vec{k}.$

T: $x(t) = 0, \quad y(t) = 2t, \quad z(t) = 1 + t, \quad t \text{ in } (-\infty, +\infty).$

Some explanations as for Sec 2.

Name: ______________________________

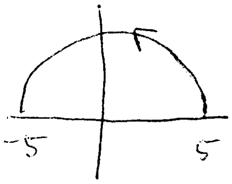
MTH 243 Sec 3 *Quiz 7* *April 14, 2005*

1. Find a parametric representation of the portion of the graph of $y = 0.5x^2 + 1$ from $\cancel{(0,0)}$ $(0,1)$ to $(2,3)$. (On the xy-plane.)

$x = t$

$y = 0.5t^2 + 1, \quad t \text{ in } [0, 2].$

2. Again on the xy-plane, find a parametrization of the upper hemicircle centered at $(0,0)$ with radius 5. Your parametrization should be such that the curve is covered once in the ccw direction.



$x = 5\cos t$

$y = 5\sin t, \quad t \text{ in } [0, \pi]$

3. Find a parametrization of the line L through $(1, 2, -3)$ and parallel to the vector $\vec{w} = -3\vec{i} + 4\vec{j} - 5\vec{k}$.

L: $x(t) = 1 - 3t$

$y(t) = 2 + 4t$

$z(t) = -3 - 5t, \quad t \text{ in } (-\infty, +\infty)$

Or $\vec{r}(t) = (1-3t)\vec{i} + (2+4t)\vec{j} + (-3-5t)\vec{k}$

4. Find a parametric representation of the line tangent to the parametric curve $\vec{r}(t) = t^2\vec{i} - 2t\vec{j} + e^t\vec{k}$, t in $(-\infty, \infty)$, at the point (0,0,1).

$\vec{r}\,'(t) = \vec{v}(t) = 2t\vec{i} - 2\vec{j} + e^t\vec{k}$

$\vec{v}(0) = -2\vec{j} + \vec{k}$

T: $x(t) = 0, \quad y(t) = -2t, \quad z(t) = 1 + t, \quad t \text{ in } (-\infty, +\infty).$