QUIZ 10 Math 34, Spring 2013

SOLUTIONS

NAME, SECTION

For each parametric expression, eliminate the parameter to get an equation satisfied by points on the curve, sketch the curve, and give the slope of the tangent at time 1.

(a) $(x, y) = (2t^2\ ,\ t)$ for $-\infty < t < \infty$

$x = 2y^2$

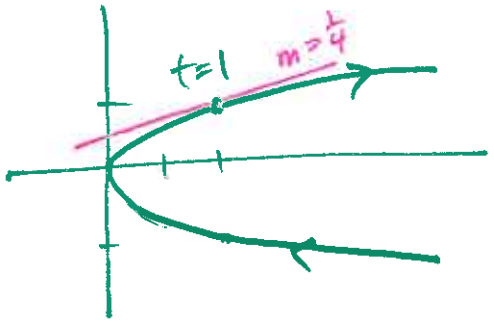
$\left(\frac{dx}{dt}, \frac{dy}{dt}\right) = (4t, 1)$

So

$\frac{dy}{dx} = \frac{1}{4t}$

$\Downarrow$

at $t=1$, $m = \frac{1}{4}$



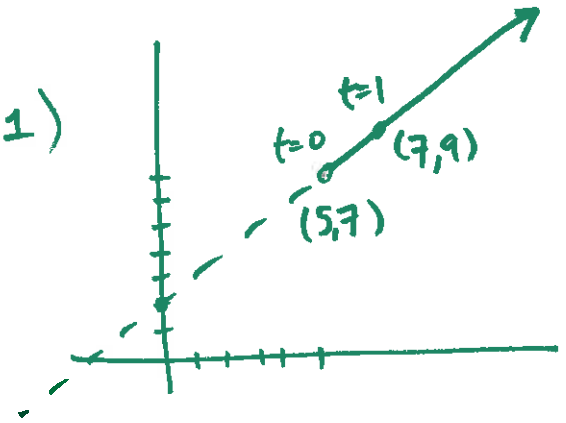
(2) $(x, y) = (2t^2 + 5\ ,\ 2t^2 + 7)$ for $-\infty < t < \infty$

$x + 2 = y$, or $y = x + 2$

(line of slope 1)

note $t^2 \geq 0$

So $x \geq 5$, $y \geq 7$



$\left(\frac{dx}{dt}, \frac{dy}{dt}\right) = (4t, 4t)$

So $\frac{dy}{dx} = \frac{4t}{4t} = 1$ for all $t \neq 0$, so at $t=1$, $m=1$.

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For each parametric expression, eliminate the parameter to get an equation satisfied by points on the curve, sketch the curve, and give the slope of the tangent at time 1.

(a) $(x, y) = (3t^2\ ,\ t)$ for $-\infty < t < \infty$

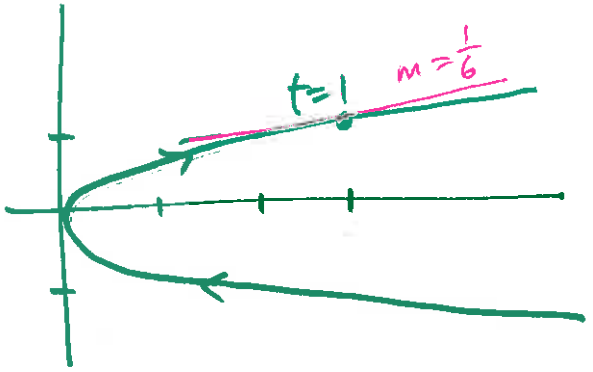
$x = 3y^2$

$\left(\frac{dx}{dt}, \frac{dy}{dt}\right) = (6t, 1)$

so $\frac{dy}{dx} = \frac{1}{6t}$

$\Downarrow$

at $t=1$, $m = \frac{1}{6}$



(2) $(x, y) = (t^2 + 15\ ,\ t^2 + 10)$ for $-\infty < t < \infty$

$x = y + 5$ or $y = x - 5$

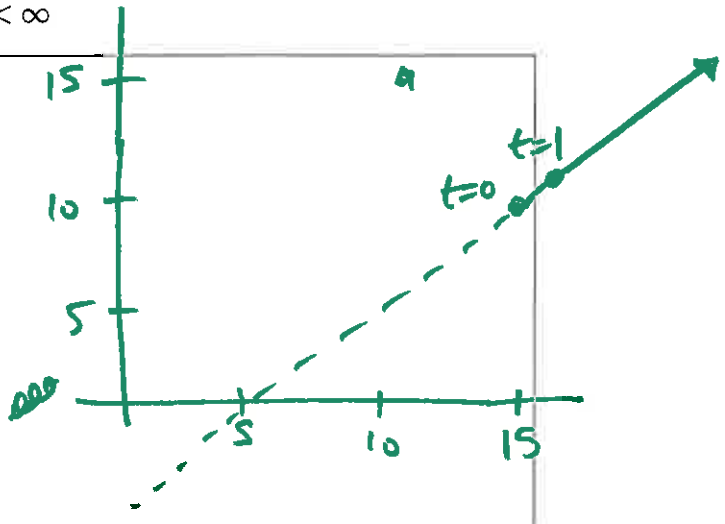
(line of slope 1)

note $t^2 \geq 0$ so $x \geq 15$, $y \geq 10$

$\left(\frac{dx}{dt}, \frac{dy}{dt}\right) = (2t, 2t)$

so $\frac{dy}{dx} = \frac{dy/dt}{dx/dt} = \frac{2t}{2t} = 1$ for all $t \neq 0$.

So at $t=1$, $m = 1$.



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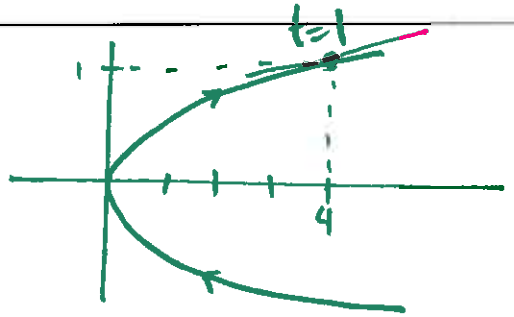
For each parametric expression, eliminate the parameter to get an equation satisfied by points on the curve, sketch the curve, and give the slope of the tangent at time 1.

(a) $(x, y) = (4t^2\ ,\ t)$ for $-\infty < t < \infty$

$x = 4y^2$



$\left(\frac{dx}{dt}, \frac{dy}{dt}\right) = (8t, 1)$

so $\frac{dy}{dx} = \frac{dy}{dt} \cdot \frac{dt}{dx} = \frac{1}{8t}$

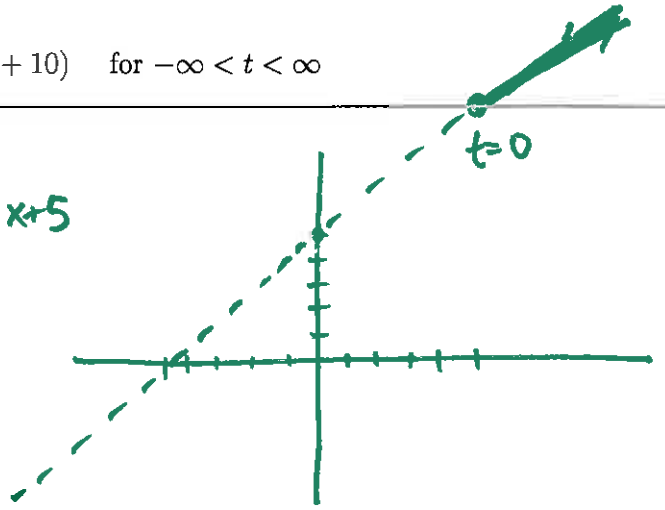
so at $t=1$, $m = \frac{1}{8}$

(2) $(x, y) = (t^2 + 5\ ,\ t^2 + 10)$ for $-\infty < t < \infty$

$x + 5 = y$ or $y = x + 5$

note $t^2 \geq 0$

so $x \geq 5$, $y \geq 10$



$\left(\frac{dx}{dt}, \frac{dy}{dt}\right) = (2t, 2t)$ so $\frac{dy}{dx} = \frac{2t}{2t} = 1$ at all $t \neq 0$

so at $t=1$, $m = 1$.