PRINTABLE VERSION

Quiz 25

$y'(t)/x'(t)$

You scored 0 out of 100

Question 1

You did not answer the question.

Find the slope of the tangent line to the curve $x(t) = \cos^3(2t),\ y(t) = \sin^3(2t)$ at the point where $t = \frac{\pi}{3}$.

$y'(t) = 3\sin^2(2t)(2\cos(2t))$

$y'(\pi/3) = 6\sin^2(2\pi/3)\cdot\cos(2\pi/3) = 6\left(\frac{3}{4}\right)\left(\frac{-1}{2}\right)$

$x'(t) = 3\cos^2(2t)(-2\sin(2t))$

$x'(\pi/3) = -6\left(\frac{1}{4}\right)\left(\frac{\sqrt{3}}{2}\right)$

$\frac{-18/8}{-6\sqrt{3}/8} = \frac{3}{\sqrt{3}} = \sqrt{3}$

a) $-3\sqrt{3}$

b) ✓ $\sqrt{3}$

c) $2\sqrt{3}$

d) $\frac{\sqrt{3}}{3}$

e) $-\sqrt{3}$

Question 2

You did not answer the question.

$y(3) = \cos(3\pi) = -1$

Find an equation in x and y for the line tangent to the curve $x(t) = 3t,\ y(t) = \cos(\pi t)$ at the point where $t = 3$.

$y'(t) = -\pi\sin(\pi t)$; $y'(3) = -\pi\sin(3\pi) = 0$

$x'(t) = 3$

$m = 0/3 = 0$

$y - y(3) = 0(x - x(3))$

$y + 1 = 0$

a) $6x = 0$

b) $3x - 3 = 0$

c) $x = -1$

d) ✓ $y = -1$

e) $y = 2$

Question 3

You did not answer the question.

Find an equation in x and y for the line tangent to the curve $x(t) = t - 2,\ y(t) = t^4$ at the point $(0, 16)$.

$0 = t - 2$ $\quad 16 = t^4$ $\quad x \quad y$

$2 = t$ $\quad 2 = t$

$y'(t) = 4t^3$ $\quad y'(2) = 32$

$x'(t) = 1$ $\quad x'(2) = 1$

$m = 32/1$

$y - 16 = 32(x - 0)$

a) $32x - y + 16 = 0$

b) $32x + y + 112 = 0$

c) $32x + y + 16 = 0$

d) $-32x + y + 16 = 0$

e) $8x - y + 48 = 0$

Question 4

You did not answer the question.

Find an equation in x and y for the line tangent to the curve $x(t) = \frac{2}{t},\ y(t) = t^2 + 2$ at the point $(1, 6)$.

$1 = 2/t$ $\quad 6 = t^2 + 2$

$t = 2$ $\quad 4 = t^2$

$\pm 2 = t$

$y'(t) = 2t$

$y'(2) = 4$

$x'(t) = \frac{-2}{t^2}$

$x'(2) = -2/4 = -1/2$

$y - 6 = \frac{4}{(-1/2)}(x - 1)$

$y - 6 = -8(x - 1)$

$y - 6 = -8x + 8$

$8x + y - 14 = 0 \quad \div 2$

a) $2x + \frac{5}{2} = 0$

b) $4x - \frac{11}{2} + \frac{1}{4}y = 0$

c) $2x - \frac{5}{2} = 0$

d) ✓ $4x - 7 + \frac{1}{2}y = 0$

e) $-4x + 3 = 0$

Question 5

You did not answer the question.

Find an equation in x and y for the line tangent to the polar curve $r = 12 - 6\sin(\theta)$ at $\theta = 0$.

$y - 0 = -2(x - 12)$

$x(\theta) = r\cos\theta = (12 - 6\sin\theta)\cos\theta$ $x(0) = 12$

$x(\theta) = 12\cos\theta - 6\sin\theta\cos\theta$

$y(\theta) = r\sin\theta = (12 - 6\sin\theta)\sin\theta$

$y(\theta) = 12\sin\theta - 6\sin^2\theta$ $y(0) = 0$

$x'(\theta) = -12\sin\theta - 6\cos^2\theta + 6\sin^2\theta$

$x'(0) = 0 - 6 + 0 = -6$ $m = \frac{12}{-6} = -2$

$y' (\theta) = 12\cos\theta - 12\sin\theta\cos\theta$

$y'(0) = 12 - 0$

a) $y = 4x + 24$ $y = -2x + 24$

b) $y = -2x + 24$

c) $y = 6x - 1$

d) $y = -2x - 12$

e) $y = -3x + 6$

Question 6

You did not answer the question.

Find an equation in x and y for the line tangent to the polar curve $r = 5\cos(2\theta)$ at $\theta = \frac{\pi}{2}$.

just like #5

a) $y = x + 5$

b) $y = -5$

c) $x = 5$

d) $y = 2x - 5$

e) $y = -6$

Question 7

You did not answer the question.

Parametrize the curve $y = -3x^3$ by a pair of differentiable functions $x = x(t),\ y = y(t)$ with $[x'(t)]^2 + [y'(t)]^2 \neq 0$ then determine the tangent line at the orgin.

$(0, 0)$

$x(t) = t$ $x'(t) = 1$ $x'(0) = 1$

$y(t) = -3t^3$ $y'(t) = -9t^2$ $y'(0) = 0$

$m = 0/1 = 0$

$y - 0 = 0(x - 0)$

$y = 0$

a) $x(t) = t, y(t) = -3t^3$; tangent line: $x = 0$

b) $x(t) = t^2, y(t) = -3t^3$; tangent line: $x = 0$

c) $x(t) = -3t^3, y(t) = t$; tangent line: $y = -1$

d) $x(t) = -3t^3, y(t) = t$; tangent line: $y = 0$

e) ✓ $x(t) = t, y(t) = -3t^3$; tangent line: $y = 0$

If $m = \frac{1}{0} \Rightarrow$ eq. of

Question 8

You did not answer the question.

Find the points (x, y) at which the curve $x(t) = t^2 - 12t,\ y(t) = t^3 - 12t$ has a vertical tangent.

a) $(-11, 1)$

b) $(12, 2)$

c) $(11, -3)$

d) ✓ $(-36, 144)$

e) $(-12, 3)$

Question 9

You did not answer the question.

Find the points (x, y) at which the curve $x(t) = 11\cos(t),\ y(t) = 11\sin(2t)$ has a horizontal tangent.

a) $\left(\frac{11\sqrt{2}}{2}, 22\right), \left(\frac{-11\sqrt{2}}{2}, 22\right), \left(\frac{11\sqrt{2}}{2}, -22\right)$, and $\left(\frac{-11\sqrt{2}}{2}, -22\right)$

b) $\left(\frac{11\sqrt{2}}{4}, 11\right), \left(\frac{-11\sqrt{2}}{4}, 11\right), \left(\frac{11\sqrt{2}}{4}, -11\right)$, and $\left(\frac{-11\sqrt{2}}{4}, -11\right)$

c) $\left(\frac{11\sqrt{2}}{2}, \frac{11}{2}\right), \left(\frac{-11\sqrt{2}}{2}, \frac{11}{2}\right), \left(\frac{11\sqrt{2}}{2}, -\frac{11}{2}\right)$, and $\left(\frac{-11\sqrt{2}}{2}, -\frac{11}{2}\right)$

d) $\left(\frac{11\sqrt{2}}{2}, 11\right), \left(\frac{-11\sqrt{2}}{2}, 11\right), \left(\frac{11\sqrt{2}}{2}, -11\right)$, and $\left(\frac{-11\sqrt{2}}{2}, -11\right)$

e) $(11\sqrt{2}, 11), (-11\sqrt{2}, 11), (11\sqrt{2}, -11)$, and $(-11\sqrt{2}, -11)$

Question 10

You did not answer the question.

Find the points (x, y) at which the curve $x(t) = 3 - \sin(t),\ y(t) = 5 + 2\cos(t)$ has a vertical tangent.

$x'(t) = -\cos t$

a) $(-2, 0)$ and $(3, 1)$

b) $(3, 2)$ and $(-1, -3)$

c) $(3, 1)$ and $(1, 3)$

d) ✓ $(2, 5)$ and $(4, 5)$

e) $(2, -2)$ and $(2, 3)$

$-\cos t = 0$

$\cos t = 0$

$t = \pi/2, 3\pi/2$

$x(\pi/2) = 3 - 1 = 2 \quad y(\pi/2) = 5$

$x(3\pi/2) = 3 + 1 = 4 \quad y(3\pi/2) = 5$