

# Parametric Equation Practice

Tangent Lines and Horizontal/Vertical Tangents

A curve  $C$  is defined by the parametric equations  $x = t^2 - 2t$  and  $y = t^2$ . Determine the equation of the line tangent to the graph of  $C$  at the point  $(3, 9)$ ?

Find all points(if any) of horizontal and vertical tangency to the curve. For any trig functions find the points only between  $[0, 2\pi]$

1.  $x = t^4 + 1, y = t^3 + t$       2.  $x = 2t^2 + 1, y = \frac{1}{3}t^3 - t$

3.  $x = 2\sin t, y = 3\cos t$       5.  $x = 10t^2, y = t^3 - 12t$

8.  $x = 4 + t^2, y = t^2 + t^3$       9.  $x = t - e^t, y = t + e^{-t}$

Find all points(if any) of horizontal and vertical tangency to the curve. For any trig functions find the points only between  $[0, 2\pi]$

1.  $x = 1 - t$      $y = t^2$     2.  $x = t + 1$      $y = t^2 + 3t$

3.  $x = 1 - t$      $y = t^3 - 3t$     4.  $x = t^2 - t + 2$      $y = t^3 - 3t$

5.  $x = 3\cos\theta$      $y = 3\sin\theta$     7.  $x = 4 + 2\cos\theta$      $y = -1 + \sin\theta$

Find tangent line of the parametric equations

1.  $x = 2t$   $y = 3t - 1$   $t = 3$     2.  $x = \sqrt{t}$   $y = 3t - 1$   $t = 1$

3.  $x = t + 1$   $y = t^2 + 3t$   $t = -1$     4.  $x = t^2 + 3t + 2$   $y = 2t$   $t = 0$

5.  $x = 2\cos\theta$   $y = 2\sin\theta$   $\theta = \frac{\pi}{4}$     6.  $x = 2 + \sec\theta$   $y = 1 + \tan\theta$   $\theta = \frac{\pi}{6}$

7.  $x = \cos\theta$   $y = 3\sin\theta$   $\theta = 0$     8.  $x = \sqrt{t}$   $y = \sqrt{t-1}$   $t = 2$

Find tangent line of the parametric equations

1.  $x = t^2 - 2$   $y = t^3 - t$   $t = 1$     2.  $x = t^3 - t$   $y = t^4 - 5t^2 + 4$   $t = -1$

3.  $x = (t^2 + 1)^2$   $y = t^4 - 1$   $t = 2$     4.  $x = \sqrt{t^2 + 5}$   $y = t^3 - t$   $t = -1$

5.  $x = t^2 - 2t$   $y = t^2 - t - 4$   $t = 3$     6.  $x = 4t - t^2$   $y = t^3 - 2t^2$   $t = 1$