

Engineering Mathematics I---Quiz-1s

1) Find parametric equations of the tangent line to the given curve at the

indicated value of t . $x = t$, $y = \frac{1}{2}t^2$, $z = \frac{1}{3}t^3$; $t = 2$

$$\boxed{\text{ANS}} \quad r(t) = ti + \frac{1}{2}t^2j + \frac{1}{3}t^3k; \quad r(2) = 2i + 2j + \frac{8}{3}k; \quad r'(t) = i + tj + t^2k;$$

$$r'(2) = i + 2j + 4k,$$

Using the point $(2, 2, 8/3)$ and the direction vector $r'(2)$, we have $x = 2 + t$,
 $y = 2 + 2t$, $z = 8/3 + 4t$.

2) Find the directional derivative of the given function at the given point in the indicated direction. $f(x, y) = (xy + 1)^2$; $(3, 2)$, the direction $\langle 5, 3 \rangle$.

$$\boxed{\text{ANS}} \quad u = (5i + 3j) / \sqrt{34}; \quad \nabla f = 2y(xy + 1)i + 2x(xy + 1)j; \quad \nabla f(3, 2) = 28i + 42j$$

$$D_u f(3, 2) = \frac{140}{\sqrt{34}} + \frac{126}{\sqrt{34}} = \frac{266}{\sqrt{34}}$$