**Example 1.** Sketch a graph of the curve given by

$$C : \mathbf{r}(t) = 2\mathbf{i} + t^2\mathbf{j} + t^3\mathbf{k}, \quad t \geq 0.$$

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**Example 2.** Let $\mathbf{r}(t) = (2\sin t)\mathbf{i} + (2\cos t)\mathbf{j} + (5\cos^2 t)\mathbf{k}$.

(a) Find $\lim\limits_{t \to \frac{\pi}{3}} \mathbf{r}(t)$.
(b) Find $\mathbf{r}'(t)$.

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**Example 3.** Find parametric equations for the tangent line to the graph of $\mathbf{r}(t) = t^2\mathbf{i} - (\sin t)\mathbf{j} + (\ln t)\mathbf{k}$, $t > 0$, at the point $P(1, \sin 1, 0)$.

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**Example 4.** Compute $\dfrac{d}{dt}\Big[\sin(t^2)\mathbf{i} + e^{t^2}\mathbf{j} + (t^2 - 1)\mathbf{k}\Big]$.

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