

$$[2][a] \int \frac{36x^6 - 60x^3 + 25}{4x^7} dx = \int \left(9x^{-1} - 15x^{-4} + \frac{25}{4}x^{-7} \right) dx$$

$$= 9 \ln|x| - 15 \left(-\frac{1}{3}x^{-3} \right) + \frac{25}{4} \left(-\frac{1}{6}x^{-6} \right) + C$$

$$= \boxed{9 \ln|x| + 5x^{-3} - \frac{25}{24}x^{-6}} + C$$

$$[b] \int \left(11x^{\frac{8}{3}} + 4x^{\frac{5}{3}} - 2x^{-\frac{1}{3}} \right) dx = 11 \left(\frac{3}{11}x^{\frac{11}{3}} \right) + 4 \left(\frac{3}{8}x^{\frac{8}{3}} \right) - 2 \left(\frac{3}{2}x^{\frac{2}{3}} \right) + C$$

$$= \boxed{3x^{\frac{11}{3}} + \frac{3}{2}x^{\frac{8}{3}} - 3x^{\frac{2}{3}}} + C$$

$$[c] \int (2 \csc x \cot x - 3 \csc^2 x) dx = \boxed{-2 \csc x + 3 \cot x} + C$$

$$[d] \begin{array}{r} x-1 \\ x^3-x^2+x \\ \hline x^3 \quad +x \\ -x^2 \\ -x^2 \quad -1 \\ \hline 1 \end{array} \quad \int \left(x-1 + \frac{1}{x^2-1} \right) dx$$

$$= \boxed{\frac{1}{2}x^2 - x + \tan^{-1}x} + C$$

$$[3][a] x-INT \rightarrow y=0 \rightarrow \boxed{2t-8t^2=0}$$

$$2t(1-4t)=0 \rightarrow \boxed{t=0, \frac{1}{4}}$$

$$t=0 \rightarrow \boxed{x=6 \cdot 0^2 - 3 \cdot 0 = 0}$$

$$t=\frac{1}{4} \rightarrow \boxed{x=6 \cdot \left(\frac{1}{4}\right)^2 - 3 \cdot \frac{1}{4} = \frac{3}{8} - \frac{3}{4} = -\frac{3}{8}}$$

$$[b] \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = \frac{2-16t}{12t-3} \Big|_{t=\frac{1}{4}} \rightarrow \frac{2-16(\frac{1}{4})}{12(\frac{1}{4})-3} \rightarrow \frac{-2}{0} \text{ DNE}$$

VERTICAL T.L. $\boxed{x = -\frac{3}{8}}$

$$[c] \frac{\frac{d}{dt} \frac{dy}{dx}}{\frac{dx}{dt}} = \frac{\frac{-16(12t-3) - (2-16t)(12)}{(12t-3)^2}}{12t-3} = \frac{48-24}{(12t-3)^3} = \boxed{\frac{24}{(12t-3)^3}}$$