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(4)

$$c) f(x) = \ln(\operatorname{cosec}(x) - \cot(x))$$

$$f'(x) = \frac{1}{\operatorname{cosec}(x) - \cot(x)} \cdot \frac{d}{dx}(\operatorname{cosec} x - \cot x)$$

$$= \frac{1}{\operatorname{cosec}(x) - \cot(x)} \cdot (-\operatorname{cosec}(x)\cot(x) - \operatorname{cosec}^2(x))$$

$$= \frac{-\operatorname{cosec}(x)\cot(x) + \operatorname{cosec}^2(x)}{\operatorname{cosec}(x) - \cot(x)}$$

$$= \frac{\operatorname{cosec}^2 x - \operatorname{cosec}(x)\cot(x)}{\operatorname{cosec}(x) - \cot(x)}$$

$$Q2) a) i) \int \frac{2x}{(4+3x^2)} dx$$

$$= \int (2x)(4+3x^2)^{-1} dx$$