10 A curve has equation $y = f(x)$ and it is given that

$$f'(x) = \left(\tfrac{1}{2}x + k\right)^{-2} - (1 + k)^{-2},$$

where k is a constant. The curve has a minimum point at $x = 2$.

(a) Find $f''(x)$ in terms of k and x, and hence find the set of possible values of k. [3]

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It is now given that $k = -3$ and the minimum point is at $(2, 3\tfrac{1}{2})$.

(b) Find $f(x)$. [4]

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(c) Find the coordinates of the other stationary point and determine its nature. [4]

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