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6 It is given that $y = \dfrac{\ln\left(2x^2+1\right)}{x+2}$.

(a) Find $\dfrac{\mathrm{d}y}{\mathrm{d}x}$. [3]

(b) Given that x increases from 2 to $2+h$, where h is small, find the approximate change in y. [2]

(c) Given that y is decreasing by 0.4 units per second, find the corresponding rate of change in x when $x = 2$. [3]

7 It is given that $f(x) = 2e^x + a$ for $x \geqslant 0$, where a is an integer

and $g(x) = \sqrt{x-1}$ for $x \geqslant 1$.

(a) Find the least value of a so that the function gf exists for all $x \geqslant 0$. [2]

(b) In the case where $a = 5$, solve the equation $gf(x) = 3$.
Give your answer correct to 3 decimal places. [3]

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