9 The functions $f(x)$ and $g(x)$ are defined as follows for $x > -\frac{1}{3}$ by

$$f(x) = x^2 + 1,$$
$$g(x) = \ln(3x + 2).$$

(a) Find $fg(x)$. [1]

(b) Solve the equation $fg(x) = 5$ giving your answer in exact form. [3]

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(c) Solve the equation $\mathrm{gg}(x) = 1$. [6]

10 The acceleration, $a\,\text{ms}^{-2}$, of a particle at time t seconds is given by $a = -\frac{45}{(t+1)^2}$. When $t = 0$ the velocity of the particle is $50\,\text{ms}^{-1}$.

(a) Find an expression for the velocity of the particle in terms of t. [4]

(b) Find the distance travelled by the particle between $t = 1$ and $t = 10$. [4]