3. [6 points] Let $G(x)$ be defined by

$$G(x) = \int_{2x+3}^{5x-7} e^{t^2-1}\, dt.$$

a. [2 points] Find a value of x such that $G(x) = 0$.

Solution: This happens when both bounds are equal, so $2x + 3 = 5x - 7$. Solving this gives $x = \frac{10}{3}$.

b. [4 points] Find $G'(3)$.

Solution: We can rewrite

$$G(x) = \int_{0}^{5x-7} e^{t^2-1}\, dt - \int_{0}^{2x+7} e^{t^2-1}\, dt$$

So

$$G'(x) = 5e^{(5x-7)^2-1} - 2e^{(2x+3)^2-1}$$

and so

$$G'(3) = 5e^{63} - 2e^{80}.$$