9D The Product Rule

1. Given that $f(x) = x^2\sqrt{3x - 1}$, find $f'(x)$.

2. Given that $y = e^{4x} \sin^2 3x$, show that $\frac{dy}{dx} = e^{4x} \sin 3x (A\cos 3x + B\sin 3x)$, where A and B are constants to be found.