Fundamental Theorem of Calculus

Use the Fundamental Theorem of Calculus to evaluate the following expressions:

1. $\dfrac{d}{d\theta} \int_{\frac{\pi}{2}}^{\theta} e^{2x} \, dx$

2. $\dfrac{d}{dx} \int_{x}^{2} \dfrac{\sin t}{t} \, dt$

3. $\dfrac{d}{dt} \int_{3}^{\cos t} e^{x^2} \, dx$

4. $\dfrac{d}{dx} \int_{2x}^{x^3} \dfrac{e^t}{t} \, dt$