some basic substitution problems

1.
$$\int e^{4x+3}\, dx =$$

2. Differentiate your answer to #1.

3.
$$\int 3x^2 \cos x^3\, dx =$$

4. Differentiate your answer to #3.

5.
$$\int e^{\sin x} \cos x\, dx =$$

6. Differentiate your answer to #5.

7.

$$\int \frac{2}{x} \ln x \, dx$$

8. Differentiate your answer to #7.

9.

$$\int \frac{2x}{x^2 + 1} \, dx$$

10. Differentiate your answer to #9.

11.

$$\int \frac{2x}{(x^2 + 1)^2} \, dx$$

12. Differentiate your answer to #11.