

1. Integrate the following.

(a) $\int (3x + 2)^5 dx$

(b) $\int_1^{e^\pi} \frac{\cos(\ln y)}{y} dy$

(c) $\int \frac{e^z}{\sqrt{1 + 2e^z}} dz$

2. What are the following derivatives?

(a) $\frac{d}{d\theta} \sec \theta$

(b) $\frac{d}{dx} \arctan x$

3. Integrate the following.

(a) $\int \frac{dx}{x^2 + 2x + 2}$ (Hint: complete the square in the denominator first.)

(b) $\int_0^{\pi/3} \sec^3 \theta \tan \theta d\theta$