

## Lecture 28: Worksheet

### Substitution

1

$$\int \sin(2x + 3) dx$$

2

$$\int \frac{1}{(x + 8)^5} dx$$

3

$$\int \frac{\log(5x)}{x} dx$$

4

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

5

$$\int \frac{e^x}{(e^x + 5)^2} ; dx$$

Here is an situation, where substitution appears in an application lets look at the probability density function. The integral

$$m = \int_{-\infty}^{\infty} x f(x) dx$$

is called the **mean** of the distribution.

6 Find the mean of the probability density function

$$f(x) = \frac{1}{\sqrt{\pi}} e^{-(x-3)^2/2} .$$