

### PROBLEM SET 3: TRIGONOMETRIC SUBSTITUTION

Note: Most of the problems were taken from the textbook [1].

**Problem 1.** Evaluate the following integrals:

$$a) \int \frac{dx}{x^2\sqrt{4-x^2}} dx$$

$$b) \int \frac{\sqrt{x^2-1}}{x^4} dx$$

$$c) \int \frac{dx}{(x^2-1)^{3/2}} dx$$

$$d) \int \sqrt{4-9x^2} dx$$

$$e) \int_{\sqrt{2}/3}^{2/3} \frac{dx}{x^5\sqrt{9x^2-1}} dx$$

$$f) \int \frac{dx}{\sqrt{x^2+2x+5}} dx$$

$$g) \int \frac{dx}{\sqrt{5+4x+x^2}} dx$$

$$h) \int_0^{\pi/2} \frac{\cos x}{\sqrt{1+\sin^2 x}} dx$$

**Problem 2.** Find the area of the region bounded by the hyperbola  $9x^2 - 4y^2 = 36$  and the line  $x = 3$ .

### REFERENCES

- [1] J. Stewart: *Single Variable Calculus* 8th Edition, Cengage Learning, Boston 2015.