

## Assignment 6-7

Integrate without using a calculator.

1.  $\int \frac{1}{x^2-1} dx$
2.  $\int \frac{3}{x^2-x-2} dx$
3.  $\int \frac{5x-2}{2x^2-x-1} dx$
4.  $\int \frac{2x^2+2x-2}{x^3-x} dx$
5.  $\int 3x \ln x dx$
6.  $\int x^2 \sin(3x) dx$
7.  $\int \frac{2x-\sqrt{x}+3}{\sqrt{x}} dx$
8.  $\int (2x+1)^6 dx$
9.  $\int (3t^2-1)^2 dt$
10.  $\int \frac{\sqrt{\ln y}}{y} dy$
11.  $\int \frac{\sec^2 \theta}{1+\tan \theta} d\theta$
12.  $\int \frac{\sec^2 \theta}{1+\tan^2 \theta} d\theta$
13.  $\int \frac{\sec^2 \theta}{(1+\tan \theta)^2} d\theta$
14.  $\int \frac{\tan \theta \sec^2 \theta}{1+\tan^2 \theta} d\theta$
15.  $\int \frac{2x^2-4}{x+1} dx$
16.  $\int e^{\cos(3u)} \sin(3u) du$
17.  $\int x^2 (\sin x^3)^{\frac{3}{2}} \cos x^3 dx$
18.  $\int \frac{e^{5x}-e^x+2}{e^{2x}} dx$
19.  $\int \frac{4x}{\sqrt{1-x^4}} dx$
20.  $\int \frac{x+5}{x^2+16} dx$
21.  $\int \frac{1}{t^2-10t+32} dt$
22.  $\int \frac{2x+12}{x^2+4x} dx$
23.  $\int_0^{\pi} 2x \cos x dx$

Differentiate:

24.  $f(x) = \frac{x^2-3}{\tan x}$
25.  $h(y) = (\ln(\sec y))^3$
26.  $x = \cos(\arcsin t)$
27.  $y = \arctan(v-1)^2$

28. For  $y = x \sin x$ , evaluate  $\frac{d^2 y}{dx^2}$  at  $x = \frac{\pi}{4}$  without a calculator.

29. Without using a calculator, find the  $x$ -values where  $y = e^x \sin x$  has horizontal tangents on the interval  $[-\pi, \pi]$ .

30. Without using a calculator, find the area of the region bounded by

$$y = \frac{2x}{x^4+1}, y = 0, \text{ and } x = 1.$$

31. a. Find a general solution of the differential equation  $y = \frac{\cos(-x)}{y'}$ .

b. Write an equation for the particular solution containing the point  $(\frac{\pi}{2}, -3)$ .

32. Find the slopes of the solution curves for  $\frac{dy}{dx} = -xy$  at the following points:

a. (0,0)

b. (0,1)

c. (1,-1)

d. (1,1)

e. (-1,-2)