## 5. Homework

**Show all your work!**          **Justify your answers!**

---

Read sections 7.1-7-4 Problems from the text book

Sec. 7.1 , #'s 8, 40, 62.

Sec. 7.2 , #'s 10.

Sec. 7.3 #6 .

Sec 7.4., #s: 8, 30, 54.

1 ) Find the volume of the solids if the area bounded by the graph of $\sin(x)$ for $0 \le x \le \pi$
and the line $y = \dfrac{1}{2}$ is rotated
   i) about the line $y = 5$,
   ii) about the line $x = -1$,

2 ) Let $n$ and $m$ be integers.

i ) Show that $\displaystyle\int_{-\pi}^{\pi} \cos(nx)\sin(mx) = 0$, if $n \ne m$.

ii ) Find $\displaystyle\int_{-\pi}^{\pi} \cos^2(nx)dx$ and $\displaystyle\int_{-\pi}^{\pi} \sin^2(nx)dx$
Do not forget $n = 0$.

3 ) Find

$$a) \int x^3 \sin(x^2)\,dx \quad b) \int x^r \ln(x)\,dx\,,\ r > -1\,, \quad c) \int e^{\alpha x}\sin x\,dx\,,\ x \in \mathbb{R}\,.$$

4 ) Find $\displaystyle\int \frac{x}{\sqrt{4 - x^4}}\,dx$

5 ) Find

$$\int \frac{x^2 + 1}{x^3 + x^2 + 4x}\,dx\,.$$

6 ) Determine the integral

$$\int_0^1 \frac{x^4 + x^2 + 1}{x^2 + 2x + 2}\,dx\,.$$

What material from the lectures and/or text book should the instructor address again?