Lösningar:

1) $\sum_{i=1}^{100} i = \frac{100(100+1)}{2} = \boxed{5050}$

2) $\int_{-1}^{1} x\cos x\,dx = \left\{ \begin{array}{l} \cos x \text{ jämn} \\ x \text{ udda} \\ \to x\cos x \text{ udda} \end{array} \right\} = \boxed{0}$

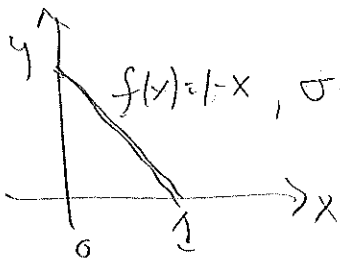
3) $\int_0^1 x^{-3/4}\,dx = \lim_{c\to 0^+} \int_c^1 x^{-3/4}\,dx = \lim_{c\to 0^+} \left(4x^{1/4}\right)_c^1 = \boxed{4}$

4) $\int_0^1 xe^x\,dx = \{\text{Partiell integration}\} = \left(xe^x\right)_0^1 - \int_0^1 e^x\,dx = e - e + 1 = \boxed{1}$

5) $\int_0^{\pi} \sin^2 x\,dx \approx \frac{\pi}{4}\left(\sin^2\frac{\pi}{4} + \sin^2\frac{\pi}{2} + \sin^2\frac{\pi}{4}\right) = \boxed{\pi/2}$

Notera att trapets ger exakt svar här!

6) $\boxed{V = 2\pi \int_a^b x f(x)\,dx}$ Se sid 396 i Adams/Essex

7) 

$\sigma(x) = 1+x$ Se exempel 8, kap 7.4 i Adams

$$m = \int_0^1 \sigma(x) f(x)\,dx = \int_0^1 1-x^2\,dx = 1 - \frac{1}{3} = \frac{2}{3}$$

$$M_{x=0} = \int_0^1 x\,\sigma(x) f(x)\,dx = \int_0^1 x - x^3\,dx = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$$

$$M_{y=0} = \frac{1}{2}\int_0^1 \sigma(x) f(x)^2\,dx = \frac{1}{2}\int_0^1 (1+x)(1-x)^2\,dx = \frac{5}{24}$$

$$\bar{x} = \frac{M_{x=0}}{m} = \frac{3}{8} \qquad \bar{y} = \frac{M_{y=0}}{m} = \frac{5}{16}$$

$$\boxed{(\bar{x}, \bar{y}) = \left(\frac{3}{8}, \frac{5}{16}\right)}$$