1. a) $\int \frac{x+\arcsin x}{\sqrt{1-x^2}}dx = -\frac{1}{2}\int \frac{-2x}{\sqrt{1-x^2}}dx + \int \frac{\arcsin x}{\sqrt{1-x^2}}dx = -\sqrt{1-x^2} + \frac{1}{2}(\arcsin x)^2 + c$

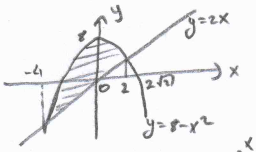
b) $\begin{array}{l} x=t^6 \\ dx = 6t^5 dt \end{array} \Big| \quad \int \frac{\sqrt{x}+\sqrt[6]{x}}{x(1-\sqrt[3]{x})}dx = 6\int \frac{t^2+1}{1-t^2}dt = 6\int\left(-1+\frac{2}{1-t^2}\right)dt = 6\left(-t+\ln\left|\frac{1+t}{1-t}\right|\right)+c = 6\left(-\sqrt[6]{x}+\ln\left|\frac{1+\sqrt[6]{x}}{1-\sqrt[6]{x}}\right|\right)+c$

2. a) $\int_0^1 \frac{dx}{\sqrt[4]{(1-x)^3}} = \lim_{\varepsilon\to 0^+}\int_0^{1-\varepsilon}(1-x)^{-3/4}dx = \lim_{\varepsilon\to 0^+} -4(1-x)^{1/4}\Big|_0^{1-\varepsilon} = -4\lim_{\varepsilon\to 0^+}(\varepsilon^{1/4}-1) = 4 < \infty$ old. yak.

b) $\int_1^\infty \frac{\ln x}{x^2}dx = \lim_{\varepsilon\to\infty}\int_1^\varepsilon \frac{\ln x}{x^2}dx = -\lim_{\varepsilon\to\infty}\left(\frac{1+\ln x}{x}\Big|_1^\varepsilon\right) = -\lim_{\varepsilon\to\infty}\left(\frac{1+\ln\varepsilon}{\varepsilon} - \frac{1+\ln 1}{1}\right) = 1 < \infty$ old. yak.

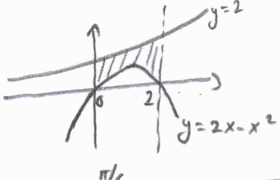
3. $f'(x) = -\frac{1}{x^2}\sin\left(\frac{1}{x^3}+1\right) - \frac{1}{3}x^{-2/3}\sin(x+1)$

4.



$A = \int_{-4}^{2}(8-x^2-2x)dx = 8x - \frac{x^3}{3} - x^2\Big|_{-4}^{2} = \left(16-\frac{8}{3}-4\right) - \left(-32+\frac{64}{3}-16\right) = \frac{28}{3}+\frac{80}{3} = 36\,br^2$

5.



$v = \pi\int_0^2\left[(2^x)^2-(2x-x^2)^2\right]dx = \pi\int_0^2(4^x-4x^2+4x^3-x^4)dx = \pi\left[\frac{4^x}{\ln 4}-\frac{4}{3}x^3+x^4-\frac{x^5}{5}\Big|_0^2\right]$

$= \pi\left(\frac{15}{\ln 4}-\frac{16}{15}\right) br^3$

6. $l = \int_0^{\pi/6}\sqrt{1+[y'(x)]^2}\,dx = \int_0^{\pi/6}\sqrt{1+\frac{\sin^2 x}{\cos^2 x}}\,dx = \int_0^{\pi/6}\sec x\,dx = \ln|\sec x+\tan x|\Big|_0^{\pi/6} = \ln\sqrt{3}\ br$

7. a) $a_n = n\left(\frac{2}{3}\right)^n \quad \lim_{n\to\infty}\frac{a_{n+1}}{a_n} = \lim_{n\to\infty}\frac{(n+1)\left(\frac{2}{3}\right)^{n+1}}{n\left(\frac{2}{3}\right)^n} = \frac{2}{3}\lim_{n\to\infty}\frac{n+1}{n} = \frac{2}{3} < 1$ old. oran testinden seri yak.

b) $\sum_{n=1}^\infty \frac{2^n-4^n}{8^n} = \sum_{n=1}^\infty\left(\frac{1}{4}\right)^n - \sum_{n=1}^\infty\left(\frac{1}{2}\right)^n = \sum_{n=1}^\infty\frac{1}{4}\left(\frac{1}{4}\right)^{n-1} - \sum_{n=1}^\infty\frac{1}{2}\left(\frac{1}{2}\right)^{n-1} = \frac{\frac{1}{4}}{1-\frac{1}{4}} - \frac{\frac{1}{2}}{1-\frac{1}{2}} = \frac{1}{3}-1 = -\frac{2}{3} < \infty$ old. seri yak.

8. $f(x) = \frac{1}{1-x}$ fonk. $x_0 = 0$ nok. sürekli ve her mert. türevl. old. $f(x) = \sum_{n=0}^\infty \frac{f^{(n)}(0)}{n!}x^n$ seri açılımı verilir.

$f(x) = \frac{1}{1-x} \Rightarrow f(0) = 1$, $f'(x) = \frac{1}{(1-x)^2} \Rightarrow f'(0) = 1 = 1!$, $f''(x) = \frac{2}{(1-x)^3} \Rightarrow f''(0) = 2 = 2!$, ... $f^{(n)}(0) = n!$ olur

o halde $f(x) = \frac{1}{1-x} = \sum_{n=0}^\infty \frac{n!}{n!}x^n = \sum_{n=0}^\infty x^n$ bulunur

9. $|A| = \begin{vmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 1 & 5 & 7 \end{vmatrix} = 1.\begin{vmatrix} 3 & 4 \\ 5 & 7 \end{vmatrix} - 2\begin{vmatrix} 2 & 4 \\ 1 & 7 \end{vmatrix} + 3\begin{vmatrix} 2 & 3 \\ 1 & 5 \end{vmatrix} = (21-20)-2(14-4)+3(10-3) = 2 \neq 0$

$Ek(A) = \begin{pmatrix} 1 & 1 & -1 \\ -10 & 4 & 2 \\ 7 & -3 & -1 \end{pmatrix}$

$A_{11} = \begin{vmatrix} 3 & 4 \\ 5 & 7 \end{vmatrix} = 1 \qquad A_{21} = -\begin{vmatrix} 2 & 3 \\ 5 & 7 \end{vmatrix} = 1 \qquad A_{31} = \begin{vmatrix} 2 & 3 \\ 3 & 4 \end{vmatrix} = -1$

$A_{12} = -\begin{vmatrix} 2 & 4 \\ 1 & 7 \end{vmatrix} = -10 \qquad A_{22} = \begin{vmatrix} 1 & 3 \\ 1 & 7 \end{vmatrix} = 4 \qquad A_{32} = -\begin{vmatrix} 1 & 3 \\ 2 & 4 \end{vmatrix} = 2$

$A_{13} = \begin{vmatrix} 2 & 3 \\ 1 & 5 \end{vmatrix} = 7 \qquad A_{23} = -\begin{vmatrix} 1 & 2 \\ 1 & 5 \end{vmatrix} = -3 \qquad A_{33} = \begin{vmatrix} 1 & 2 \\ 2 & 3 \end{vmatrix} = -1$

$A^{-1} = \frac{1}{|A|}.Ek(A) = \frac{1}{2}\begin{pmatrix} 1 & 1 & -1 \\ -10 & 4 & 2 \\ 7 & -3 & -1 \end{pmatrix}$

10. $\Delta = \begin{vmatrix} 1 & 2 & 1 \\ 3 & -1 & 1 \\ 2 & 3 & -1 \end{vmatrix} = 1.\begin{vmatrix} -1 & 1 \\ 3 & -1 \end{vmatrix} - 2\begin{vmatrix} 3 & 1 \\ 2 & -1 \end{vmatrix} + 1.\begin{vmatrix} 3 & -1 \\ 2 & 3 \end{vmatrix} = (1-3)-2(-3-2)+(9+2) = 19 \neq 0$

$\Delta_1 = \begin{vmatrix} 2 & 2 & 1 \\ 7 & -1 & 1 \\ -4 & 3 & -1 \end{vmatrix} = 2\begin{vmatrix} -1 & 1 \\ 3 & -1 \end{vmatrix} - 2\begin{vmatrix} 7 & 1 \\ -4 & -1 \end{vmatrix} + 1.\begin{vmatrix} 7 & -1 \\ -4 & 3 \end{vmatrix} = 2(1-3)-2(-7+4)+(21-4) = 19$

$\Delta_2 = \begin{vmatrix} 1 & 2 & 1 \\ 3 & 7 & 1 \\ 2 & -4 & -1 \end{vmatrix} = 1.\begin{vmatrix} 7 & 1 \\ -4 & -1 \end{vmatrix} - 2\begin{vmatrix} 3 & 1 \\ 2 & -1 \end{vmatrix} + 1.\begin{vmatrix} 3 & 7 \\ 2 & -4 \end{vmatrix} = (-7+4)-2(-3-2)+(-12-14) = -19$

$\Delta_3 = \begin{vmatrix} 1 & 2 & 2 \\ 3 & -1 & 7 \\ 2 & 3 & -4 \end{vmatrix} = 1.\begin{vmatrix} -1 & 7 \\ 3 & -4 \end{vmatrix} - 2\begin{vmatrix} 3 & 7 \\ 2 & -4 \end{vmatrix} + 2\begin{vmatrix} 3 & -1 \\ 2 & 3 \end{vmatrix} = (4-21)-2(-12-14)+2(9+2) = 57$

$x = \frac{\Delta_1}{\Delta} = 1, \quad y = \frac{\Delta_2}{\Delta} = -1, \quad z = \frac{\Delta_3}{\Delta} = 3$