a) $\int\left(-3x^3 + \frac{1}{12}x^2 + 8x\right)dx = -\frac{3}{4}x^4 + \frac{1}{36}x^3 + 4x^2 + C$

b) $\int\left(e^x - e^{-x}\right)dx = e^x + e^{-x} + C$

c) $\int\left(\sin x + x^2\right)dx = -\cos x + \frac{x^3}{3} + C$

d) $\int\left(\frac{1}{x} + \frac{1}{x^2}\right)dx = \ln|x| - \frac{1}{x}$

e) $\int\left(\sqrt{x} + \frac{1}{4}\sqrt[6]{x}\right)dx = \int\left(x^{\frac{1}{2}} + \frac{1}{4}x^{\frac{1}{6}}\right)dx =$

$= \frac{2}{3}x^{\frac{3}{2}} + \frac{1}{4}\cdot\frac{6}{7}x^{\frac{1+6}{6}} + C =$

$= \frac{2}{3}x^{\frac{3}{2}} + \frac{3}{14}x^{\frac{7}{6}} + C$

$= \frac{2}{3}\cdot\sqrt{x^3} + \frac{3}{14}\cdot\sqrt[6]{x^7}$

! $\int(\underbrace{\sin x + x^2}_{\text{Formvariable Konstante}})\,dt = \underline{(\sin x + x^2)\cdot t} + C$

$$\int (\sin 2t + x^2)\,dt =$$

$$= -\frac{1}{2}\cos 2t + x^2 \cdot t + C$$

$$\int e^{4x}\,dx = \frac{1}{4}e^{4x} + C$$

$$\int 2^x\,dx = \int (e^{\ln 2})^x\,dx =$$

$$\boxed{a = e^{\ln a}}$$

$$\int e^{\ln 2 \cdot x}\,dx = \frac{1}{\ln 2}e^{\ln 2 \cdot x} = \frac{1}{\ln e} \cdot 2^x$$

$$f(x) = \frac{3}{x-5}$$

DL, $x \to \pm\infty$ $\quad x = 5$

$$\lim_{h \to 0} f(5 \pm h) = \lim_{h \to 0} \frac{3}{5 \pm h - 5} = \lim_{h \to 0} \frac{3}{\pm h} = \pm\infty$$

$$f(x) = \frac{2e^x}{e^x + 9}$$

$$f'(x) = \frac{(e^x+9)2e^x - 2e^x \cdot e^x}{(e^x+9)^2} =$$

$$= \frac{18e^x}{(e^x+9)^2}$$

$$e^x \cdot e^x$$

$$e^{2x} \neq e^{(x^2)}$$