## Diferentseerimise põhivalemid (TULETISTE tabel)

**Diferentseerimise omadused:**

Kui $u = f(x)$ ja $v = g(x)$, siis

1) $(u \pm v)' = u' \pm v'$ ;

2) $(u \cdot v)' = u' \cdot v + u \cdot v'$ ;

3) $\left(\dfrac{u}{v}\right)' = \dfrac{u' \cdot v - u \cdot v'}{v^2}$ ;

4) $(c \cdot u)' = c \cdot u'$, kus $c$ on konstant.

Kui $c$ on konstant, siis $c' = 0$ (*konstandi tuletis on null*).

### Tuletiste tabel:

1. $x' = 1$

2. $\left(x^\alpha\right)' = \alpha x^{\alpha-1}$

3. $\left(\sqrt{x}\right)' = \dfrac{1}{2\sqrt{x}}$

4. $\left(\dfrac{1}{x}\right)' = -\dfrac{1}{x^2}$

5. $\left(a^x\right)' = a^x \ln a$

6. $\left(e^x\right)' = e^x$

7. $\left(\log_a x\right)' = \dfrac{1}{x \ln a}$

8. $\left(\ln x\right)' = \dfrac{1}{x}$

9. $\left(\sin x\right)' = \cos x$

10. $\left(\cos x\right)' = -\sin x$

11. $\left(\tan x\right)' = \dfrac{1}{\cos^2 x}$

12. $\left(\arcsin x\right)' = \dfrac{1}{\sqrt{1-x^2}}$

13. $\left(\arccos x\right)' = -\dfrac{1}{\sqrt{1-x^2}}$

14. $\left(\arctan x\right)' = \dfrac{1}{1+x^2}$

15. $(\text{arccot})' = -\dfrac{1}{1+x^2}$

16. Liitfunktsiooni tuletis

$$y'_x = y'_u \cdot u'_x$$

kus $y(x) = y(u(x))$

## Integreerimise põhivalemid (INTEGRAALIDE tabel)

1) $\displaystyle\int 0\,dx = C$

2) $\displaystyle\int dx = x + C$, $\quad \displaystyle\int k \cdot dx = k \cdot x + C$

3) $\displaystyle\int x^n dx = \dfrac{x^{n+1}}{n+1} + C, \quad n \neq -1$

4) $\displaystyle\int \dfrac{dx}{x} = \ln|x| + C$

**Integraali omadused**

$$\int [f_1(x) \pm f_2(x)]\,dx = \int f_1(x)dx \pm \int f_2(x)dx$$

$$\int a f(x)dx = a \int f(x)dx$$

5) $\displaystyle\int a^x dx = \dfrac{a^x}{\ln a} + C$

6) $\displaystyle\int e^x dx = e^x + C$

7) $\displaystyle\int \sin x\,dx = -\cos x + C$

8) $\displaystyle\int \cos x\,dx = \sin x + C$

9) $\displaystyle\int \dfrac{dx}{\cos^2 x} = \tan x + C$

10) $\displaystyle\int \dfrac{dx}{\sin^2 x} = -\cot x + C$

11) $\displaystyle\int \dfrac{dx}{\sqrt{1-x^2}} = \arcsin x + C$

12) $\displaystyle\int \dfrac{dx}{x^2+1} = \arctan x + C$

13. $\displaystyle\int \dfrac{dx}{x \pm a} = \ln|x \pm a| + C$

14. $\displaystyle\int e^{k \cdot x + b}dx = \dfrac{1}{k} \cdot e^{kx+b} + C$

15. $\displaystyle\int \sin(kx+b)dx = -\dfrac{1}{k}\cos(kx+b) + C$

16. $\displaystyle\int \cos(kx+b)dx = \dfrac{1}{k}\sin(kx+b) + C$

17. $\displaystyle\int \dfrac{dx}{a^2+x^2} = \dfrac{1}{a}\arctan\dfrac{x}{a} + C$

18. $\displaystyle\int \dfrac{dx}{a^2-x^2} = \dfrac{1}{2a}\ln\left|\dfrac{x+a}{x-a}\right| + C$

19. $\displaystyle\int \dfrac{dx}{\sqrt{a^2-x^2}} = \arcsin\dfrac{x}{a} + C$

20. $\displaystyle\int \dfrac{dx}{\sqrt{x^2+a^2}} = \ln\left|x + \sqrt{x^2+a^2}\right| + C$

21. $\displaystyle\int \dfrac{dx}{\sqrt{x^2-a^2}} = \ln\left|x + \sqrt{x^2-a^2}\right| + C$

22. $\displaystyle\int \sqrt{x^2+a^2}\,dx = \dfrac{x}{2}\sqrt{x^2+a^2} + \dfrac{a}{2}\ln\left|x + \sqrt{x^2+a^2}\right| + C$

23. $\displaystyle\int \sqrt{a^2-x^2}\,dx = \dfrac{x}{2}\sqrt{a^2-x^2} - \dfrac{a^2}{2}\arcsin\dfrac{x}{2} + C$