

5.6=22

Evaluier $I = \int \frac{dx}{\sqrt{4+2x-x^2}}$

Lösung

$$x^2 - 2x - 4 = (x-1)^2 - 1 - 4 = (x-1)^2 - 5$$

$$I = \int \frac{dx}{\sqrt{5 - (x-1)^2}}$$

SUB: $u = \dots$
 $du = dx$

$$= \int \frac{du}{\sqrt{(\sqrt{5})^2 - u^2}}$$

$$= \sin^{-1} \frac{u}{\sqrt{5}} + C = \sin^{-1} \frac{x-1}{\sqrt{5}} + C$$

prüfen: $\frac{d}{dx} \left(\sin^{-1} \frac{x-1}{\sqrt{5}} + C \right)$

$$= \frac{1/\sqrt{5}}{\sqrt{1 - \left(\frac{x-1}{\sqrt{5}}\right)^2}} = \frac{1}{\sqrt{5 - (x-1)^2}}$$