Mathematikschulaufgabe

Zinses – Zins Rechnung

$y = 1000 \bullet 1{,}05^{\,x}$ (x := Anzahl der Jahre; 1000 := Anfangskapital)

Logarithmus

$a^b = c$

$\log_a c = b$ (Logarithmus von c zur Basis a)

Rechenregeln zum Logarithmus

$\log_a (u \bullet v) = \log_a u + \log_a v$

$\log_a (u/v) = \log_a u - \log_a v$

$\log_a u^r = r \bullet \log_a u$

Erweiterung der Trigonometrie Funktion

1. Quadrant

$\alpha = \hat{\alpha}$
$\sin \alpha > 0$
$\cos \alpha > 0$
$\tan \alpha > 0$

2. Quadrant

$\alpha = 180 - \hat{\alpha}$
$\sin \alpha = \sin(180° - \hat{\alpha}) = \sin \hat{\alpha}$
$\cos \alpha = \cos(180° - \hat{\alpha}) = -\cos \hat{\alpha}$
$\tan \alpha = \tan(180° - \hat{\alpha}) = -\tan \hat{\alpha}$

3. Quadrant

$\alpha = 180 + \hat{\alpha}$
$\sin \alpha = \sin(180° + \hat{\alpha}) = -\sin \hat{\alpha}$
$\cos \alpha = \cos(180° + \hat{\alpha}) = -\cos \hat{\alpha}$
$\tan \alpha = \tan(180° + \hat{\alpha}) = \tan \hat{\alpha}$

4. Quadrant

$\alpha = 360 - \hat{\alpha}$
$\sin \alpha = \sin(360° - \hat{\alpha}) = -\sin \hat{\alpha}$
$\cos \alpha = \cos(360° - \hat{\alpha}) = \cos \hat{\alpha}$
$\tan \alpha = \tan(180° - \hat{\alpha}) = \tan \hat{\alpha}$

Negativer Winkel

$\sin(-\alpha) = -\sin \alpha$
$\cos(-\alpha) = \cos \alpha$
$\tan(-\alpha) = -\tan \alpha$

Trigonometrie

$$\sin \alpha = \frac{\text{Gegenkathete}}{\text{Hypotenuse}}$$

$$\cos \alpha = \frac{\text{Ankathete}}{\text{Hypotenuse}}$$

$$\tan \alpha = \frac{\text{Gegenkathete}}{\text{Ankathete}}$$

$$\sin 0 \;=\; 0 \;=\; \cos 90$$

$$\sin 30 \;=\; \frac{1}{2} \;=\; \cos 60$$

$$\sin 45 \;=\; \frac{\sqrt{2}}{2} \;=\; \cos 45$$

$$\sin 60 \;=\; \frac{\sqrt{3}}{2} \;=\; \cos 30$$

$$\sin 90 \;=\; 1 \;=\; \cos 0$$

Sinussatz

$$\frac{\sin \alpha}{\sin \beta} \;=\; \frac{a}{b}$$

Lösungsmöglichkeiten beim Sinussatz

keine Lösung:
$$c \bullet \sin \alpha > a$$
eine Lösung:
$$c \bullet \sin \alpha = a$$
zwei Lösungen:
$$c \bullet \sin \alpha < a < c$$

Kosinussatz

$$a^2 = b^2 + c^2 - 2\,b\,c \cos \alpha$$

$$\cos \alpha = \frac{b^2 + c^2 - a^2}{2\,b\,c}$$