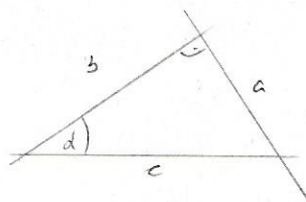


Vereinfache:



① a) $\tan d \cdot \cos d = \frac{\sin d}{\cos d} \cdot \cos d = \underline{\sin d}$

b) $\frac{\sin d}{\tan d} = \frac{\sin d}{\frac{\sin d}{\cos d}} = \underline{\cos d}$

c) $\frac{1}{(\cos d)^2} - 1 = \frac{1 - \cos^2 d}{\cos^2 d} = \frac{\sin^2 d}{\cos^2 d} = \underline{\tan^2 d}$

d) $\frac{\sin^2 d}{1 - \cos d} = \frac{\sin^2 d (1 + \cos d)}{(1 - \cos d)(1 + \cos d)} = \frac{\sin^2 d (1 + \cos d)}{1 - \cos^2 d} = \frac{\sin^2 d (1 + \cos d)}{\sin^2 d} = \underline{1 + \cos d}$

e) $\frac{1}{\sin d + 1} - \frac{1}{\sin d - 1} = \frac{(\sin d - 1) - (\sin d + 1)}{\sin^2 d - 1} = \frac{-2}{\sin^2 d - 1} = \frac{2}{1 - \sin^2 d} = \underline{\frac{2}{\cos^2 d}}$

f) $\frac{\tan d - 1}{\sin d - \cos d} = \frac{\frac{a}{b} - 1}{\frac{a}{c} - \frac{b}{c}} = \frac{\frac{a-b}{b}}{\frac{a-b}{c}} = \frac{a-b}{b} \cdot \frac{c}{a-b} = \frac{c}{b} = \frac{1}{\frac{b}{c}} = \underline{\frac{1}{\cos d}}$

g) $\frac{\tan d + 1}{\sin d + \cos d} = \frac{\frac{a}{b} + 1}{\frac{a}{c} + \frac{b}{c}} = \frac{\frac{a+b}{b}}{\frac{a+b}{c}} = \frac{a+b}{b} \cdot \frac{c}{a+b} = \underline{\frac{1}{\cos d}}$

② a) $\sqrt{1 + \cos d} \cdot \sqrt{1 - \cos d} = \sqrt{(1 + \cos d)(1 - \cos d)} = \sqrt{1 - \cos^2 d} = \sqrt{\sin^2 d} = \underline{\sin d}$

b) $\sqrt{\sin d + 1} \cdot \sqrt{\sin d - 1} = \sqrt{\sin^2 d - 1} = \sqrt{\sin^2 d - (\sin^2 d + \cos^2 d)} = \sqrt{-\cos^2 d} = \underline{0}$

c) $\frac{1 - \sin d}{1 + \sin d} - \frac{1 + \sin d}{1 - \sin d} = \frac{(1 - \sin d)^2 - (1 + \sin d)^2}{1^2 - \sin^2 d} = \frac{(1 - 2\sin d + \sin^2 d) - (1 + 2\sin d + \sin^2 d)}{\cos^2 d} = \frac{-4\sin d}{\cos^2 d}$
nur für $d=90$

d) $\sqrt{\frac{8}{1 + \cos d} + \frac{8}{1 - \cos d}} = \sqrt{\frac{8(1 - \cos d) + 8(1 + \cos d)}{1 - \cos^2 d}} = \sqrt{\frac{16}{\sin^2 d}} = \underline{\frac{4}{\sin d}}$

③ a) $[1 + \tan^2 d] \cdot \cos d = \cos d + \frac{\sin^2 d}{\cos^2 d} \cdot \cos d = \frac{\cos^2 d + \sin^2 d}{\cos d} = \underline{\frac{1}{\cos d}}$

b) $\sin^4 d - \cos^4 d = (\sin^2 d + \cos^2 d) \cdot (\sin^2 d - \cos^2 d) = \underline{\sin^2 d - \cos^2 d}$
 $(= \sin^2 d - (1 - \sin^2 d) = 2\sin^2 d - 1)$

c) $\tan d \cdot \sin d + \cos d = \frac{\sin d}{\cos d} \cdot \sin d + \cos d = \frac{\sin^2 d + \cos^2 d}{\cos d} = \underline{\frac{1}{\cos d}}$

d) $\left(1 - \frac{1}{\cos d}\right) \left(1 + \frac{1}{\cos d}\right) = 1 - \frac{1}{\cos^2 d} = \frac{\cos^2 d - 1}{\cos^2 d} = \frac{-(1 - \cos^2 d)}{\cos^2 d} = -\frac{\sin^2 d}{\cos^2 d} = -\underline{\tan^2 d}$

$$(4) a) \sqrt{\frac{\sin d - \tan d}{(\cos d - 1) \cdot \sin d}} = \sqrt{\frac{\frac{a}{c} - \frac{a}{b}}{\left(\frac{b}{c} - \frac{c}{c}\right) \cdot \frac{a}{c}}} = \sqrt{\frac{ab - ac}{bc} : \frac{ab - ac}{c^2}} = \sqrt{\frac{ab - ac}{bc} \cdot \frac{c^2}{ab - ac}} = \sqrt{\frac{c}{b}} = \sqrt{\frac{1}{\frac{b}{c}}} = \sqrt{\frac{1}{\cos d}}$$

$$b) \frac{1}{1 - \sin d} - \frac{\sin d}{(\cos d)^2} = \frac{1 \cdot (1 + \sin d)}{(1 - \sin d)(1 + \sin d)} - \frac{\sin d}{\cos^2 d} = \frac{1 + \sin d}{1 - \sin^2 d} - \frac{\sin d}{\cos^2 d} = \frac{1 + \sin d + \sin d}{\cos^2 d} = \frac{1}{\cos^2 d}$$

$$c) \frac{(1 + \cos d)^2 + (\sin d)^2}{(1 - \cos d)^2 - (\sin d)^2} = \frac{1 - 2\cos d + \cos^2 d + \sin^2 d}{1 - 2\cos d + \cos^2 d - (1 - \cos^2 d)} = \frac{2 - 2\cos d}{-2\cos d + 2\cos^2 d} = \frac{2(1 - \cos d)}{(-2) \cdot \cos d (1 - \cos d)} = \frac{1}{\cos d}$$

$$d) \frac{1 - [\sin^4 d - \cos^4 d]}{\cos^4 d} = \frac{1 - (\sin^2 d + \cos^2 d)(\sin^2 d - \cos^2 d)}{\cos^4 d} = \frac{\sin^2 d + \cos^2 d - (\sin^2 d - \cos^2 d)}{\cos^4 d} = \frac{2\cos^2 d}{\cos^4 d} = \frac{2}{\cos^2 d}$$

$$(5) a) 2(1 + \cos d) - \sin^2 d = 2(1 + \cos d) - (1 - \cos^2 d) = 2 + 2\cos d - 1 + \cos^2 d = \cos^2 d + 2\cos d + 1 = (1 + \cos d)^2$$

$$b) (\sin d + \cos d)^2 + (\sin d - \cos d)^2 = \sin^2 d + 2\sin d \cdot \cos d + \cos^2 d + \sin^2 d - 2\sin d \cdot \cos d + \cos^2 d = 2(\sin^2 d + \cos^2 d) = 2$$

$$c) \sin d \cdot \cos^2 d + \sin^3 d = \sin d (\cos^2 d + \sin^2 d) = \sin d$$

$$d) (2\cos d)^2 + 12\sin d - 13 = 4(1 - \sin^2 d) + 12\sin d - 13 = -4\sin^2 d + 12\sin d - 9 = (-1) \cdot (2\sin d - 3)^2$$

$$(6) \text{ Verwend: } \tan d = \frac{a}{b}$$

$$\tan(90^\circ - d) = \tan \rho = \frac{b}{a} = \frac{1}{\frac{a}{b}} = \frac{1}{\tan d}$$

$$a) \tan d \cdot \tan(90^\circ - d) = \tan d \cdot \frac{1}{\tan d} = 1$$

$$b) \frac{1}{\tan(90^\circ - d)} + \tan d = \frac{1}{\frac{1}{\tan d}} + \tan d = \tan d + \tan d = 2 \cdot \tan d$$

$$c) \sqrt{1 + \tan^2(90^\circ - d)} = \sqrt{1 + \frac{1}{\tan^2 d}} = \sqrt{\frac{\sin^2 d + \cos^2 d}{\sin^2 d}} = \sqrt{\frac{1}{\sin^2 d}} = \frac{1}{\sin d}$$

$$d) \sin d + \cos d \cdot \tan(90^\circ - d) = \sin d + \cos d \cdot \frac{\cos d}{\sin d} = \frac{\sin^2 d + \cos^2 d}{\sin d} = \frac{1}{\sin d}$$

$$e) \frac{\cos(90^\circ - d)}{\cos d} = \frac{\cos \rho}{\cos d} = \frac{\sin d}{\cos d} = \tan d$$