7 = -2 sin (3x 17) -3 Unit circle

8. Proving Identities Coto = Coso tand = sind COSO = 1 seca cora seco - 1 sund Coco = 1 sin v = 1 fano. Coto = 1 tano = (Cos 0 + sin 0 = 1 1+ fan 20 = see 29 14 Cot 20 = coc 20 scotano = 1 sino Coso Coso - sin d Cos20 Ex 1 - Coro + sino coro

Ex tana + arta = sin a + cosa - sin 2 + Cos x Cos x sin x V= 1 Cosa sina Prove tanx + cox = sin x (secx + cotx) pin x (prcx + cotx) = sinx. I + sin x Cox sin x = fanx + Cosx Fanx + cosx = sinx + cosx - sin x cox sainx = sin x (_ + Cosx) = sinx (secx + cutx) d Prove Cota + 1 = Coca (cora + sina) CSCX (COSX + sinx) = I (COSX + sina) = CDA + 1 = Cvta + 1

1st work Complicated (more trig) 2. (-) substitution algebra U_ kind sene & cosine 3) Keep an ege that you he not working () = ege a 3 - 6 3 = (a - 6) (a 2 + a 6 + 6 24 a3+63 = (a+6) (a2-a6+62) $a^2 - 6^2 = (a-6)(a+6)$ a 4 - 64 = (a + 62) (a - 6) (a + 6) a2+ b2 # a2-62

cost - sintt = 1- tant Trover Cos 2/ Cost = sin 4 = (cost + sin 2 f) (cost - sin 2 f) Ces 2 t $= \frac{\cos^2 t - \sin^2 t}{\cos^2 t}$ $= \frac{\cos^2 t}{\cos^2 t} \frac{\sin^2 t}{\cos^2 t}$ = 1 - tan26 TOMI 1 + Coso = sin o 1-000 1-coso = 1-coso = (1-coro) (1+coro) 1-coro = 1+ coo -1+cv0 = (+cv0) 1-cv0 - 1- crod - sin 2 0 1 9 (1+ coso) (1- coso) = sun 8 1- coso = sin o suro = sur d

Trove tanà (12 cotà) = 1-sinà tana (+ cota) = tana + tanacota = tanx + 1 $= \frac{1}{\cos^2\alpha} \quad \cos \alpha \in ma-1$ -1- sin 2 Prove sin a + 1+coa = 2 csea sin \(\alpha \) \(\frac{1 + \cos \alpha}{\sin \alpha} \) = sin x + 1+2 Cox + Cox x sin x (1+cus x) = 2 +2 CV> X mina (1+ CV> X) = 2 (1+ wxx) pin a (1+ cox a) = 2 CSCX /.

Prove 1+ sunt - Cost - sunt & 1+ sint _ 1+ sint 1-sint

Cost - Cost 1-sint = 1 - sin2f Cost (1-sinf) (3,4)-= Cest (1- sint) - Cost / Counter example Coto + as 0 = coto ces 0 Cot II + Cos II = 1+ 1 = 3 cot # cos # = 1 1 = 1 $\frac{3}{2} \neq \frac{1}{2}$

 $\frac{2}{\cot^2\theta} + 3\cot^2\theta - 4 = \cot^2\theta - 4$ $\cot^2\theta + 3\cot^2\theta - 4 = (\cot^2\theta + 4)(\cot^2\theta)$ $\cot^2\theta + 4 = \cot^2\theta + 4$ $\cot^2\theta + 4 = \cot^2\theta + 4$ = cuto - 1 25/ (1+fanx) + (fanx-1) = 2 sec x (1+ fanx) 2 (fanx -1) = 1+2 tanx - stan x +1-2 tanx + tan x = 2 + 2 fan x = 2 (1+ fan x) = 2 pec x / $= \frac{\cot^2 x}{\cot^2 x} + 2 \cot x + 1$ $\frac{2}{2} \frac{\cos x - 1}{\cos x + 1}$ = $Csc^2x - 1$ Cofx $(cscx+1)^2$ Cx2x +2cscx+1 $= (\csc x - 1)(\csc x + 1)$ $(cscx+1)^2$ $=\frac{Cocx-1}{Cocx+1}$

5, mplify!

Cor3x Cos2x - min 3x min 2x = Cos (3x+2x) $= \cos(5x)$ Cos (90°- A) = sin A Cos (90 - A) = cos 90 cos A + sin 90 sin A = 0 + sin A - sin A tract? It leave Cos(150) = Cos (600-450) = cv360 cv3cf5 - 4 sin 60 sin U50 $= \frac{1}{2} \sqrt{2} + \frac{\sqrt{3}}{2} \sqrt{2}$ $= \frac{1}{2} \sqrt{2} + \sqrt{6} \sqrt{6} \sqrt{2}$ $= \frac{4}{2} \sqrt{2} + \sqrt{6} \sqrt{6} \sqrt{2}$ 5, 1 = 3 Q 1 = -Q? 5 5:1 (A+3) Cos (A-1B) Fan (A+B) sin (A-B) Co (P-B) fan (A-B)