1.1 $$f(\beta) = 2\cot\beta \frac{n^2\sin^2\beta - 1}{n^2(2+\cos(2\beta))+2} - \tan\theta$$

Find values of β where $f(\beta) = 0$

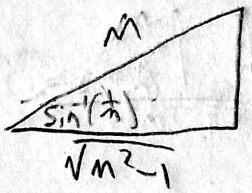
at $\theta = 0$

when $\beta = 90°$

$$f(90°) = 2\cot(90°)\frac{n^2\sin^2(90°) - 1}{n^2(2+\cos(180°))+2} - \tan(0)$$

$$\Rightarrow \boxed{f(90°) = 0}$$

when $\beta = \sin^{-1}\left(\frac{1}{n}\right)$



$\cos 2\beta = \cos^2\beta - \sin^2\beta$

$$f\left(\sin^{-1}\frac{1}{n}\right) = 2\sqrt{n^2-1}\left(\frac{n^2\left(\frac{1}{n}\right)^2 - 1}{n^2\left(2+\frac{n^2-1}{n}-\frac{1}{n}\right)+2}\right) - \tan(a)$$

$$\Rightarrow \boxed{f\left(\sin^{-1}\frac{1}{n}\right) = 0}$$