7 In this question, all angles are in radians.

(a) Solve the equation $\sec^2\theta = \tan\theta + 3$ for $-\pi < \theta < \pi$. [5]

(b) Show that, for $0 < \phi < \frac{\pi}{2}$, $\dfrac{\tan\phi}{\sqrt{1-\cos^2\phi}} = \sec\phi$. [3]

(c) Given that $\operatorname{cosec} x = -\frac{17}{8}$ and that $\frac{3\pi}{2} < x < 2\pi$, find the exact value of $\cot x$. [2]