Exercise 162

For the following exercises, solve the trigonometric equations on the interval $0 \leq \theta < 2\pi$.

$$\csc^2\theta + 2\csc\theta + 1 = 0$$

Solution

$$\csc^2\theta + 2\csc\theta + 1 = 0$$

$$(\csc\theta + 1)^2 = 0$$

$$\csc\theta + 1 = 0$$

$$\csc\theta = -1$$

$$\frac{1}{\sin\theta} = -1$$

$$\sin\theta = -1$$

Therefore,

$$\theta = \left\{\frac{3\pi}{2}\right\}.$$