1.) (5 pts.) Find an antiderivative of the function \( f(x) = \frac{\cos x}{1 + \sin^2 x} \).

\[
F(x) = \arctan \left( \sin x \right) + C
\]

Check:

\[
F'(x) = \frac{1}{1 + (\sin x)^2} \cdot \cos x = f(x).
\]

2.) (5 pts.) One of the slope fields below matches the DE \( \frac{dy}{dt} = y - t \), and the other matches the DE \( \frac{dy}{dt} = y + t \). Which is which? Justify your answer.

Justify: in \( \frac{dy}{dt} = y - t \), slopes are 0 where \( y - t = 0 \), or \( y = t \). This is the line \( y = t \), and this matches the left slope field. Right slope field: slopes are 0 along \( y + t = 0 \), or \( y = -t \). Alternately: compare slopes at particular points. At \( (2,0) \), for example, the left slope field has a negative slope but the right slope field has a positive slope. This matches: \( 0 - 2 < 0 \), \( 0 + 2 > 0 \).