$$(f(\gamma_2))' = \gamma_2' f'(\gamma_2)$$

$$= (-3-3i) \times \left(\frac{-4i}{i}\right)^2 = -3-3i$$

$$\text{Arg}(-3-3i) = \frac{5\pi}{4}$$

Angle from $f(\gamma_1)$ to $f(\gamma_2)$ is $\frac{5\pi}{4}$