Solution (#99) Let $a = 2$, $b = 1 + i$, $c = 3 + it$. Then

$$\begin{aligned} \measuredangle abc &= \arg\left(\frac{(3+it)-(1+i)}{(2-(1+i))}\right) \\ &= \arg\left(2 + i\left(t-1\right)\right) - \arg\left(1-i\right) \\ &= \tan^{-1}\left(\frac{t-1}{2}\right) + \frac{\pi}{4}. \end{aligned}$$

So

$$\begin{aligned} \tan^{-1}\left(\frac{t-1}{2}\right) + \frac{\pi}{4} &= \frac{\pi}{3}, \\ \implies \tan^{-1}\left(\frac{t-1}{2}\right) &= \frac{\pi}{12}, \\ \implies \frac{t-1}{2} &= \tan\left(\frac{\pi}{12}\right) = 2 - \sqrt{3}, \\ \implies t &= 1 + 2\left(2-\sqrt{3}\right) = 5 - 2\sqrt{3}. \end{aligned}$$

If t becomes large and positive then $\tan^{-1}\left(\left(t-1\right)/2\right) \approx \pi/2$ and so $\measuredangle abc = 3\pi/4$.