The slope of the curve $y = c\sqrt{x}$ is $y' = \dfrac{c}{2\sqrt{x}}$ and the slope of the tangent line $y = \dfrac{7}{4}x + 7$ is $\dfrac{7}{4}$. These must be equal at the point of tangency $\left(a, c\sqrt{a}\right)$, so $\dfrac{c}{2\sqrt{a}} = \dfrac{7}{4} \ \Rightarrow \ c = \dfrac{7}{2}\sqrt{a}$. The y-coordinates must be equal at $x = a$, so

$$c\sqrt{a} = \dfrac{7}{4}a + 7 \ \Rightarrow \ \left(\dfrac{7}{2}\sqrt{a}\right)\sqrt{a} = \dfrac{7}{4}a + 7 \ \Rightarrow \ \dfrac{7}{2}a = \dfrac{7}{4}a + 7 \ \Rightarrow$$

$a = 4$. Since $c = \dfrac{7}{2}\sqrt{a}$, we have $c = \dfrac{7}{2}\sqrt{4} = 7$.