Determine the equation of the osculating circle to the graph of the following vector-valued function at the indicated value of *t*:

1. $\bar{r}(t) = \langle \sqrt{t}, t^2 \rangle$ at $t = 1$

2. $\bar{r}(t) = \langle t^2 + 1, t + 1 \rangle$ at $t = 1$

Solutions:

1. $\left(x + \frac{5}{12} \right)^2 + \left(y - \frac{20}{3} \right)^2 = \frac{17^3}{144}$ sc

2. $\left(x - \frac{9}{2} \right)^2 + \left(y + 3 \right)^2 = \frac{125}{4}$