Find the unit tangent vector to the curve \( \vec{s}(t) = < 3\pi^3 \sin t, \frac{t^4}{4}, \pi^2 \cos t > \) at the point \((0, 4\pi^4, \pi^2)\)

Find the equation for a vector defined function for the position at a given time \(t\) of a particle if its acceleration is given as \( \vec{a}(t) = <-t^2, e^{-t}, -\sin(t) >, \vec{v}(0) = \vec{s}(0) = <1, 1, 1> \)

Two vector valued curves \(<\cos t, -2\sin t, \sqrt{t}>\) and \(<-\cos 2t, 2\sin t, \sqrt{t}>\) meet at some time \(t\) on the interval \([0, 2\pi]\). At white time \(t\) do the two functions meet?

When the two curves meet, what is the angle made between the two curves?

What is the angle made between the vectors normal to the two curves when the two curves meet?