

Integrate.

$$1. \boxed{5} \int_0^{16} \frac{\cos(\sqrt{x})}{\sqrt{x}} dx = 2 \int_0^4 \cos u \, du = 2 \sin u \Big|_0^4$$

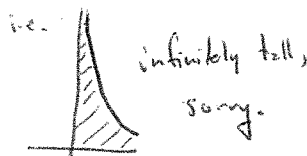
$$\text{let } u = \sqrt{x}$$

$$du = \frac{1}{2\sqrt{x}} dx$$

$$\begin{array}{ccc} x & \longrightarrow & u \\ 0 & & 0 \\ 16 & & 4 \end{array}$$

$$= 2 \sin 4$$

Note: this is improper,



$$2. \boxed{5} \int \frac{dt}{4+9t^2} = \frac{1}{4} \int \frac{dt}{1+\left(\frac{3t}{2}\right)^2} = \frac{1}{4} \cdot \frac{2}{3} \int \frac{\frac{3}{2} dt}{1+\left(\frac{3t}{2}\right)^2}$$

$$\text{let } u = \frac{3t}{2}$$

$$du = \frac{3}{2} dt$$

$$= \frac{1}{6} \int \frac{du}{1+u^2}$$

$$= \frac{1}{6} \arctan\left(\frac{3t}{2}\right) + C$$