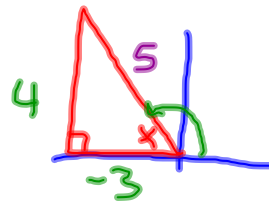


$$\begin{aligned}
 & \frac{13}{\cos^2 x \sin^4 x} \\
 & \quad \downarrow \qquad \qquad \rightarrow \sin^2 x \cdot \sin^2 x \\
 & \frac{1 + \cos 2x}{2} \cdot \left[\frac{1 - \cos 2x}{2} \cdot \frac{1 - \cos 2x}{2} \right] \\
 & \frac{1 + \cos 2x}{2} \cdot \frac{1}{4} \left[1 - 2\cos 2x + \cos^2 2x \right] \\
 & \qquad \qquad \qquad \qquad \qquad \qquad \downarrow \\
 & \qquad \qquad \qquad \qquad \qquad \qquad \frac{1 + \cos 4x}{2}
 \end{aligned}$$

$$4 \quad \tan x = -\frac{4}{3} \text{ in II}$$



$$\begin{aligned}
 \sin 2x &= 2 \sin x \cos x \\
 &= 2 \cdot \frac{4}{5} \cdot -\frac{3}{5} = -\frac{24}{25}
 \end{aligned}$$

$$\begin{aligned}
 \cos 2x &= \cos^2 x - \sin^2 x \\
 &= \left(-\frac{3}{5}\right)^2 - \left(\frac{4}{5}\right)^2 = \frac{9}{25} - \frac{16}{25} = -\frac{7}{25}
 \end{aligned}$$

$$\begin{aligned}
 \tan 2x &= \frac{2 \tan x}{1 - \tan^2 x} = \frac{2 \cdot \left(-\frac{4}{3}\right)}{1 - \left(-\frac{4}{3}\right)^2} = \frac{-\frac{8}{3}}{1 - \frac{16}{9}} = \frac{-\frac{8}{3}}{-\frac{7}{9}} = \frac{24}{7}
 \end{aligned}$$

$$\begin{aligned}
 \sin 15^\circ &= \sin \frac{30^\circ}{2} = \sqrt{\frac{1 - \cos 30^\circ}{2}} \\
 \sin \frac{\theta}{2} &= \sqrt{\frac{1 - \frac{\sqrt{3}}{2}}{2}} \cdot \frac{2}{2} \\
 &= \sqrt{\frac{2 - \sqrt{3}}{4}} \\
 &= \frac{1}{2} \sqrt{2 - \sqrt{3}}
 \end{aligned}$$

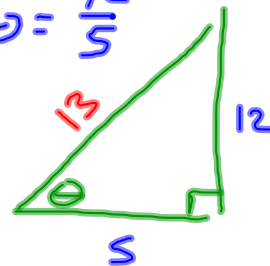
$$48) \cos(2 \tan^{-1}(\frac{12}{5}))$$

$$\begin{aligned}
 \cos(2\theta) &= \cos^2 \theta - \sin^2 \theta \\
 &= \left(\frac{5}{13}\right)^2 - \left(\frac{12}{13}\right)^2
 \end{aligned}$$

$$\frac{25}{169} - \frac{144}{169} = \frac{-119}{169}$$

$$\tan^{-1}\left(\frac{12}{5}\right) = \theta$$

$$\tan \theta = \frac{12}{5}$$



$$\frac{51}{\cos 2\theta}$$

$$= \cos^2 \theta - \sin^2 \theta$$

$$\left(\frac{-4}{5}\right)^2 - \left(\frac{-3}{5}\right)^2$$

$$\frac{16}{25} - \frac{9}{25} = \frac{7}{25}$$

$$\sin \theta = -\frac{3}{5}$$

in III

$$\cos \theta = -\frac{4}{5}$$

