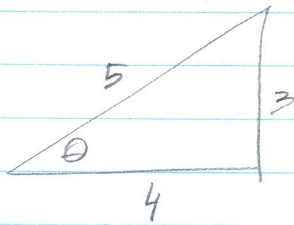


Double Angle Identities



$$1) \sin \theta = \frac{3}{5}$$

$$2) \cos \theta = \frac{4}{5}$$

$$3) \tan \theta = \frac{3}{4}$$

$$4) \csc \theta = \frac{5}{3}$$

$$5) \sec \theta = \frac{5}{4}$$

$$6) \cot \theta = \frac{4}{3}$$

$$7) \sin 2\theta = 2 \sin \theta \cos \theta = 2 \left(\frac{3}{5}\right) \left(\frac{4}{5}\right) = \frac{24}{25}$$

$$8) \cos 2\theta = \cos^2 \theta - \sin^2 \theta = \left(\frac{4}{5}\right)^2 - \left(\frac{3}{5}\right)^2 = \frac{7}{25}$$

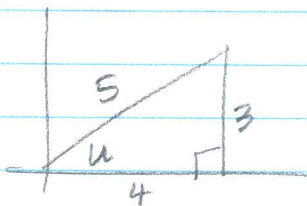
$$9) \tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta} = \frac{2 \left(\frac{3}{4}\right)}{1 - \frac{9}{16}} = \frac{\frac{6}{4}}{\frac{7}{16}} = \frac{24}{7}$$

$$10) \csc 2\theta = \frac{25}{24}$$

$$11) \sec 2\theta = \frac{25}{7}$$

$$12) \cot 2\theta = \frac{7}{24}$$

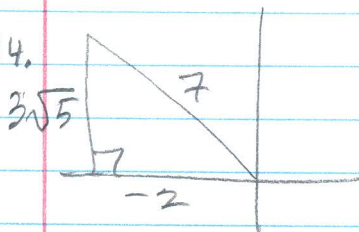
13.



$$\sin 2u = \frac{24}{25} \quad \cos 2u = \frac{7}{25} \quad \tan 2u = \frac{24}{7}$$

(Same as above!)

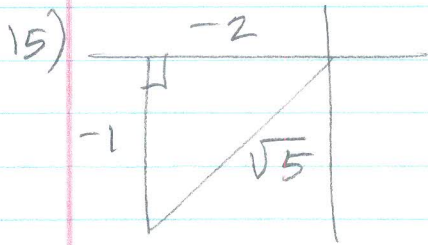
14.



$$\begin{aligned} \sin 2u &= 2 \sin u \cos u \\ &= 2 \left(\frac{3\sqrt{5}}{7}\right) \left(\frac{-2}{7}\right) = \frac{-12\sqrt{5}}{49} \end{aligned}$$

$$\begin{aligned} \cos 2u &= \cos^2 u - \sin^2 u \\ &= \left(\frac{-2}{7}\right)^2 - \left(\frac{3\sqrt{5}}{7}\right)^2 \\ &= \frac{4}{49} - \frac{45}{49} = \frac{-41}{49} \end{aligned}$$

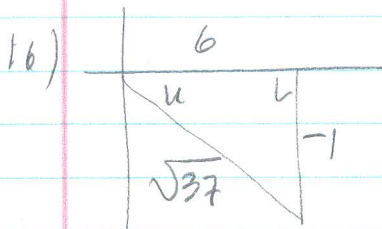
$$\tan 2u = \frac{\sin 2u}{\cos 2u} = \frac{-12\sqrt{5}}{49} \cdot \frac{49}{-41} = \frac{12\sqrt{5}}{41}$$



$$\begin{aligned}\sin 2u &= 2\sin u \cos u \\ &= 2\left(\frac{-1}{\sqrt{5}}\right)\left(\frac{-2}{\sqrt{5}}\right) = \frac{4}{5}\end{aligned}$$

$$\begin{aligned}\cos 2u &= \cos^2 u - \sin^2 u \\ &= \left(\frac{-2}{\sqrt{5}}\right)^2 - \left(\frac{-1}{\sqrt{5}}\right)^2 = \frac{3}{5}\end{aligned}$$

$$\tan 2u = \frac{\sin 2u}{\cos 2u} = \frac{4}{3}$$



$$\begin{aligned}\sin 2u &= 2\sin u \cos u \\ &= 2\left(\frac{-1}{\sqrt{37}}\right)\left(\frac{6}{\sqrt{37}}\right) = \frac{-12}{37}\end{aligned}$$

$$\begin{aligned}\cos 2u &= \cos^2 u - \sin^2 u \\ &= \left(\frac{6}{\sqrt{37}}\right)^2 - \left(\frac{-1}{\sqrt{37}}\right)^2 = \frac{35}{37}\end{aligned}$$

$$\tan 2u = \frac{\sin 2u}{\cos 2u} = \frac{-12}{35}$$