

$$1. \sin \theta = \frac{4}{5}, \cos \theta = \frac{3}{5}, \tan \theta = \frac{4}{3}, \csc \theta = \frac{5}{4}, \sec \theta = \frac{5}{3}, \cot \theta = \frac{3}{4}$$

$$3. \text{ The remaining side is obtained by the Pythagorean Theorem: } \sqrt{7^2 - 4^2} = \sqrt{33}. \text{ Then } \sin \theta = \frac{4}{7},$$

$$\cos \theta = \frac{\sqrt{33}}{7}, \tan \theta = \frac{4}{\sqrt{33}} = \frac{4\sqrt{33}}{33}, \csc \theta = \frac{7}{4}, \sec \theta = \frac{7}{\sqrt{33}} = \frac{7\sqrt{33}}{33}, \cot \theta = \frac{\sqrt{33}}{4}$$

$$5. c = \sqrt{3^2 + 2^2} = \sqrt{13}$$

$$(a) \sin \alpha = \cos \beta = \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$$

$$(b) \tan \alpha = \cot \beta = \frac{2}{3}$$

$$(c) \sec \alpha = \csc \beta = \frac{\sqrt{13}}{3}$$

$$7. \text{ Since } \sin 30^\circ = \frac{x}{25}, \text{ we have } x = 25 \sin 30^\circ = 25 \cdot \frac{1}{2} = \frac{25}{2}.$$

$$9. \text{ Since } \sin 60^\circ = \frac{x}{13}, \text{ we have } x = 13 \sin 60^\circ = 13 \cdot \frac{\sqrt{3}}{2} = \frac{13\sqrt{3}}{2}.$$

$$11. \text{ Since } \tan 36^\circ = \frac{12}{x}, \text{ we have } x = \frac{12}{\tan 36^\circ} \approx 16.51658.$$

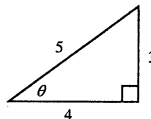
$$13. \frac{x}{28} = \cos \theta \Leftrightarrow x = 28 \cos \theta, \text{ and } \frac{y}{28} = \sin \theta \Leftrightarrow y = 28 \sin \theta$$

$$15. \sin \theta = \frac{3}{5}. \text{ Then the third side is}$$

$$x = \sqrt{5^2 - 3^2} = 4. \text{ The other five ratios are}$$

$$\cos \theta = \frac{4}{5}, \tan \theta = \frac{3}{4}, \csc \theta = \frac{5}{3}, \sec \theta = \frac{5}{4},$$

$$\text{and } \cot \theta = \frac{4}{3}.$$

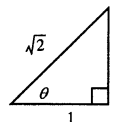


$$17. \cot \theta = 1. \text{ Then the third side is}$$

$$r = \sqrt{1^2 + 1^2} = \sqrt{2}. \text{ The other five ratios are}$$

$$\sin \theta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}, \cos \theta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2},$$

$$\tan \theta = 1, \csc \theta = \sqrt{2}, \text{ and } \sec \theta = \sqrt{2}.$$



$$19. \sec \theta = 7. \text{ The third side is}$$

$$y = \sqrt{7^2 - 1^2} = \sqrt{48} = 4\sqrt{3}.$$

$$\text{The other five ratios are } \sin \theta = \frac{4\sqrt{3}}{7}, \cos \theta = \frac{1}{7},$$

$$\tan \theta = 4\sqrt{3}, \csc \theta = \frac{7}{4\sqrt{3}} = \frac{7\sqrt{3}}{12}, \text{ and } \cot \theta = \frac{1}{4\sqrt{3}} = \frac{\sqrt{3}}{12}.$$

