

Math 121 – Section 8.1 Solutions

9. $\cos \theta = \frac{12}{13}$, $\sin \theta = \frac{5}{13}$, $\tan \theta = \frac{5}{12}$, $\sec \theta = \frac{13}{12}$, $\csc \theta = \frac{13}{5}$, $\cot \theta = \frac{12}{5}$

11. $\cos \theta = \frac{3}{\sqrt{13}}$, $\sin \theta = \frac{2}{\sqrt{13}}$, $\tan \theta = \frac{2}{3}$, $\sec \theta = \frac{\sqrt{13}}{3}$, $\csc \theta = \frac{\sqrt{13}}{2}$, $\cot \theta = \frac{3}{2}$

29. $b = 5$, $B = 20^\circ$

$$a = \frac{b}{\tan B} = \frac{5}{\tan 20^\circ}$$
$$c = \frac{b}{\sin B} = \frac{5}{\sin 20^\circ}$$
$$A = 70^\circ$$

39. $a = 5$, $b = 3$

$$c = \sqrt{a^2 + b^2} = \sqrt{34}$$
$$A = \tan^{-1} \frac{a}{b} = \tan^{-1} \frac{5}{3}$$
$$B = \tan^{-1} \frac{b}{a} = \tan^{-1} \frac{3}{5}$$

69. Let $d_1 = \frac{500}{\tan 32^\circ}$ and $d_2 = \frac{500}{\tan 23^\circ}$. Then the distance is:

$$d = d_1 + d_2 = \frac{500}{\tan 32^\circ} + \frac{500}{\tan 23^\circ}$$

76. The angle is $\theta = \tan^{-1} \frac{4}{15}$.

79. Let x be the horizontal distance from the white ball to the point of contact on the wall and let θ be the angle in question. Then,

$$\tan \theta = \frac{3}{x} = \frac{1.8}{5-x}$$
$$3(5-x) = 1.8x$$
$$15 - 3x = 1.8x$$
$$4.8x = 15$$
$$x = \frac{15}{4.8}$$
$$= 3\frac{1}{8} \text{ feet}$$
$$= 3 \text{ feet, } 2 \text{ inches}$$

Therefore, the ball should hit the wall 1 foot, 14 inches to the left of the side pocket.