1 Problems

Exercise 1. A person stands 20 feet from the base of a wall and measures the angle of elevation tot he top as $60°$. How tall is the wall?
Exercise 2. A pole is supported by a rope that runs from the top of the pole to the ground. The rope is 60 feet long and makes an angle with the ground of $30°$. How tall is the pole?
Exercise 3. Convert $\frac{\pi}{6}$ to degrees.
Exercise 4. If $\cos(x) = \frac{1}{2}$ and $0 < x < \frac{\pi}{2}$, find $\sin(x)$.
Exercise 5. If $\cos(x) = \frac{1}{2}$ and $0 < x < \frac{\pi}{2}$, find $\tan(x)$.

2 Answer key

Exercise 1. $20\sqrt{3}$ feet.

Exercise 2. 30 feet.

Exercise 3. $30°$.

Exercise 4. $\frac{\sqrt{3}}{2}$.

Exercise 5. $\sqrt{3}$.

3 Solutions

Exercise 1. The angle from the floor to the person's line of sight is $60°$ and $\tan 60° = \sqrt{3}$. Moreover, $\tan(x) = \frac{opposite}{adjacent}$ so we have $20*\tan(60°) = opposite$.

Exercise 2. The angle formed by the rope and the ground is $30°$. The length of the rope is 60 feet, which is the hypotenuse. Using that $\sin(x) = \frac{opposite}{hypotenuse}$, where *opposite* is the length of the pole, we have that the pole is $60*\sin 30° = 60*\frac{1}{2} = 30$.

Exercise 3. $\frac{\pi}{6} * \frac{180°}{\pi} = \frac{180}{6} = 30$.

Exercise 4. Draw a right triangle in the first quadrant with hypotenuse 2 and horizontal length 1. Let x denote the angle formed by the hypotenuse and the horizontal axis. By Pythagoras, the vertical length is $\sqrt{3}$, and so $\sin(x) = \frac{\sqrt{3}}{2}$ since $\sin(x) = \frac{opposite}{hypotenuse}$.

Exercise 5. Draw a right triangle in the first quadrant with hypotenuse 2 and horizontal length 1. Let x denote the angle formed by the hypotenuse and the horizontal axis. By Pythagoras, the vertical length is $\sqrt{3}$ and so $\tan(x) = \sqrt{3}$ since $\tan(x) = \frac{opposite}{adjacent}$.