1 Problems

Exercise 1. You measure the distance to a tower to be 4 m. You turn through an angle of 30° and measure the distance to a different tower to be 8 m. How far are the towers?

Exercise 2. You have a triangle with angle $A = 45°$ and angle $C = 60°$. The opposing side a to A has length 10. Find the length of the opposing side c to angle C.

Exercise 3. You have a triangle with angle $A = 45°$ and angle $C = 30°$. The opposing side c to C has length 6. Find the length of the opposing side a to angle A.

Exercise 4. You have a triangle with angle $A = 60°$ and angle $B = 45°$. The side opposite to B has length 16. Find the length of the side opposite to A.

Exercise 5. Compute $sin(cos^{-1}(\frac{5}{13}))$.

2 Answer key

Exercise 1. $x = \sqrt{16 + 64(1 - \frac{\sqrt{3}}{2})}$

Exercise 2. $c = \frac{10\sqrt{3}}{\sqrt{2}}$

Exercise 3. $a = 6\sqrt{2}$.

Exercise 4. $x = \frac{16\sqrt{3}}{\sqrt{2}}$

Exercise 5. $\frac{12}{13}$

3 Solutions

Exercise 1. Use the law of cosines: $x^2 = 4^2+8^2-2*4*8cos(30°) = 16+64-64(\frac{\sqrt{3}}{2}) = 16+64(1-\frac{\sqrt{3}}{2})$. So $x = \sqrt{16 + 64(1 - \frac{\sqrt{3}}{2})}$.

Exercise 2. Use the law of sines: $\frac{sin45°}{10} = \frac{sin60°}{c}$. Cross multiplying gives us $c = \frac{10\sqrt{3}}{\sqrt{2}}$.

Exercise 3. Use the law of sines: $\frac{sin45°}{a} = \frac{sin30°}{6}$. Cross multiplying gives us $6\sqrt{2}$.

Exercise 4. Law of sines: $\frac{sin45°}{16} = \frac{sin60°}{x}$. Solving for x gives us $\frac{16\sqrt{3}}{\sqrt{2}}$.

Exercise 5. By Pythagoras the remaining side of the triangle is 12. So we obtain $sin(x) = \frac{12}{13}$.