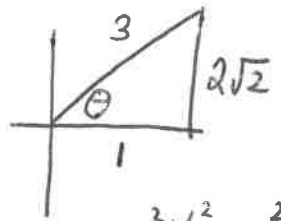


Key

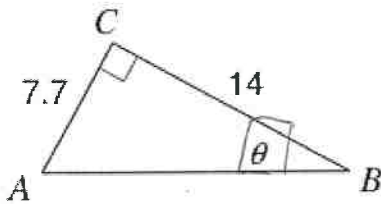
1. If $\sec \theta = 3$, find the remaining 5 trigonometric ratios.

$$\sec \theta = \frac{H}{A} = \frac{3}{1}$$

$$\sin \theta = \frac{2\sqrt{2}}{3} \quad \tan \theta = \frac{2\sqrt{2}}{1} = 2\sqrt{2} \quad \csc \theta = \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{4} \quad \cot \theta = \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}}{4} \quad \cos \theta = \frac{1}{3}$$



2. Solve the triangle below. Round answers to the nearest tenth.



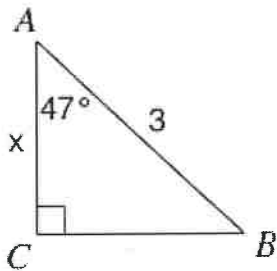
$$\tan \theta = \frac{7.7}{14} \rightarrow \theta = \tan^{-1}\left(\frac{7.7}{14}\right) = 28.8^\circ$$

$$\angle A = 90 - 28.8 = 61.2^\circ$$

$$\overline{AB} \rightarrow 7.7^2 + 14^2 = c^2 \quad \overline{AB} = 15.9$$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 1^2 + (2\sqrt{2})^2 &= 3^2 \\ 1 + 8 &= 9 \\ b^2 &= 8 \\ b &= \sqrt{8} = 2\sqrt{2} \end{aligned}$$

3. Solve the triangle below. Round answers to the nearest tenth.



$$\cos 47 = \frac{x}{3}$$

$$x = 3 \cos 47$$

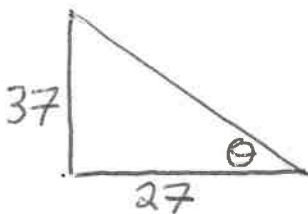
$$x = 2.1$$

$$\angle B = 90 - 47 = 43^\circ$$

$$BC \rightarrow 2.1^2 + y^2 = 3^2 \quad y^2 = 9 - 2.1^2 \quad y = 2.1$$

$$BC = 2.1$$

4. A 37-foot tree casts a 27-foot shadow. What is the angle of elevation of the sun?

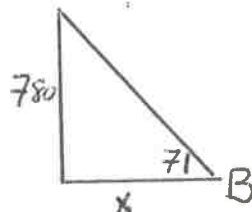
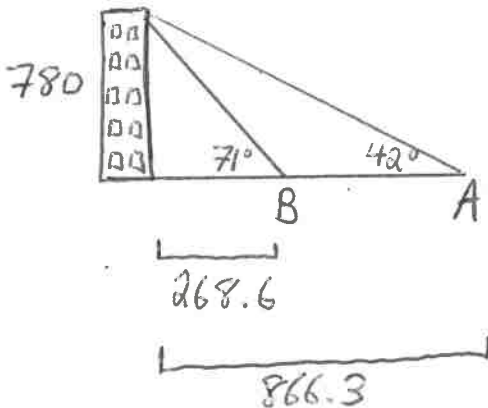


$$\tan \theta = \frac{37}{27}$$

$$\theta = \tan^{-1}\left(\frac{37}{27}\right)$$

$$\theta = 53.9^\circ$$

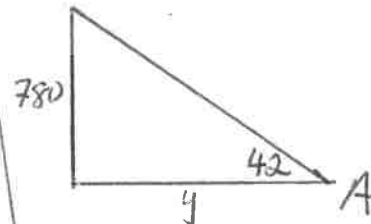
5. You are a block away from a skyscraper that is 780 feet tall. Your friend is between the skyscraper and yourself. The angle of elevation from your position to the top of the skyscraper is 42° . The angle of elevation from your friend's position to the top of the skyscraper is 71° . To the nearest foot, how far are you from your friend?



$$\tan 71 = \frac{780}{x}$$

$$x \tan 71 = 780$$

$$x = \frac{780}{\tan 71} = 268.6$$



$$\tan 42 = \frac{780}{y}$$

$$y \tan 42 = 780$$

$$y = \frac{780}{\tan 42}$$

$$y = 866.3$$

Distance from A to B is

$$866.3 - 268.6 = 597.7$$