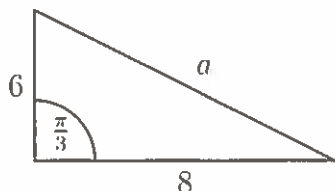


Quick Hit 8

1. Find the side length a in the following triangle. Note: the drawing is not to scale.

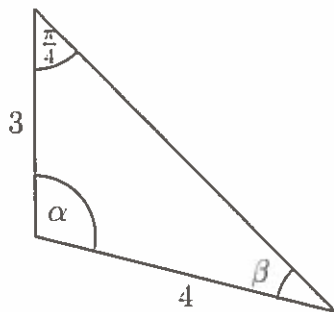
2 sides and angle between them means we need to use law of cosines



$$\begin{aligned} a^2 &= 6^2 + 8^2 - 2 \cdot 6 \cdot 8 \cos\left(\frac{\pi}{3}\right) \\ &= 36 + 64 - 96\left(\frac{1}{2}\right) \\ &= 100 - 48 = 52 \\ \rightarrow a &= \sqrt{52} \end{aligned}$$

2. Fill in the missing angles in the following triangle. Note: $\alpha > \frac{\pi}{2}$ and $\beta < \frac{\pi}{2}$.

2 sides and an angle not between them means we can use law of sines



$$\frac{\sin(\beta)}{3} = \frac{\sin(\pi/4)}{4}$$

$$\rightarrow \sin(\beta) = \frac{3 \sin(\pi/4)}{4} = \frac{3(\frac{\sqrt{2}}{2})}{4} = \frac{3\sqrt{2}}{8}$$

since $\beta < \frac{\pi}{2}$, we can use arcsin, so $\beta = \arcsin\left(\frac{3\sqrt{2}}{8}\right)$

$$\text{Then } \alpha = \pi - \frac{\pi}{4} - \arcsin\left(\frac{3\sqrt{2}}{8}\right)$$