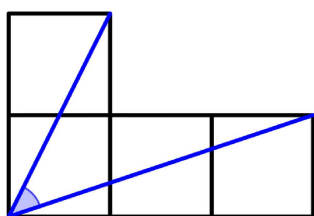


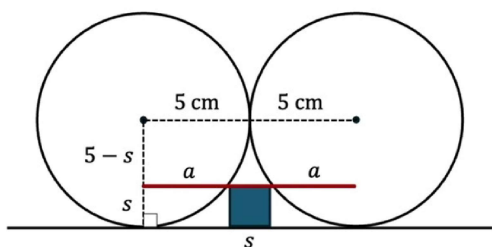
Summer Assignment - Engineering Mechanics: Statics

To be successful in Statics, a solid foundation in geometry and trigonometry are required. Solve the following problems, show all work to justify your answer. All answers should be exact (*no decimal answers unless it is specified*).

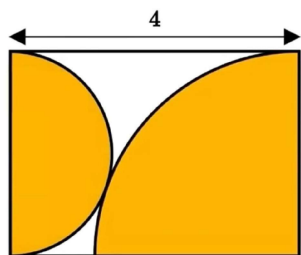
1. Four identical squares are arranged in an L shape as shown. What is the angle between the two blue lines? (Can you solve the problem without using trigonometry?)



2. What is the area of the blue square?

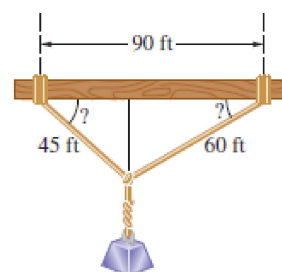


3. What is the area of the shaded region?



4. Find values for b such that the triangle has two solutions. $A = 20^\circ$, $a = 7$

5. A weight is supported by cables attached to both ends of a balance beam, as shown in the figure. What angles are formed between the beam and the cables?

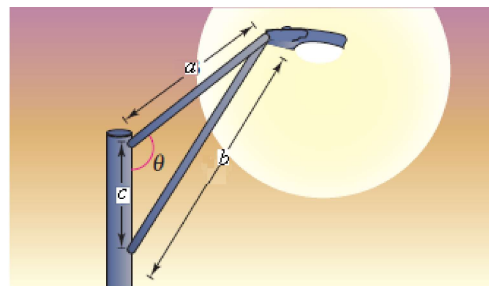


6. Use the Law of Sines to solve (if possible) the triangle. Round your answers to two decimal places.

$$A = 120^\circ, a = b = 42$$

7. Determine the angle θ in the design of the streetlight shown in the following figure.

$$a = 4, b = 5\frac{1}{2}, c = 3$$



8. Given $\mathbf{u} = \langle 6, 12 \rangle$ and $\mathbf{v} = \langle 3, -12 \rangle$, find $2\mathbf{u} + 5\mathbf{v}$.