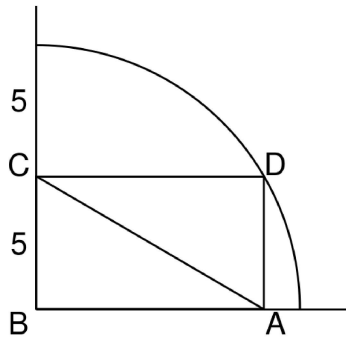


Summer Assignment - Introduction to Engineering

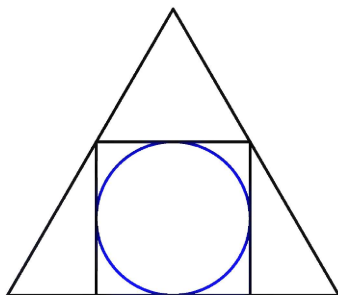
Engineering, no matter what discipline, requires solid mathematical and geometry skills, critical thinking, problem solving skills and thinking outside the box. The following problems can be solved using basic algebra, geometry, trigonometry, and creative thinking.

- 1 Suppose you have two ropes and a lighter. Each rope takes exactly one hour to burn, but not necessarily evenly; that is, the first half might burn in the first 10 minutes and the second half in 50 minutes. Mark all times you can measure by burning the ropes, and explain how to do it.
- a) 1 hour b) 45 minutes c) 30 minutes
d) 15 minutes

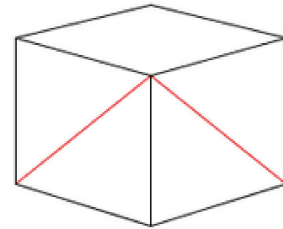
- 2 A rectangle is inscribed in a quadrant of a circle as shown in the figure. What is the length of the diagonal AC



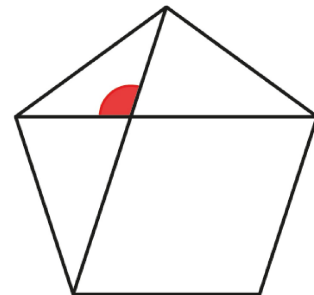
- 3 A unit circle (blue) is inscribed in a square, which in turn is inside an equilateral triangle as shown in the figure. What is the area of the triangle?



- 4 What is the angle made by two of the face diagonals that meet at the corner of the cube (in red)?



- 5 The polygon is a regular pentagon. What is the value of the angle highlighted in red?



- 6 A square is inscribed inside a circle, which in turn is inscribed in a square with a length side of 2. What is the area of the smaller square?

