

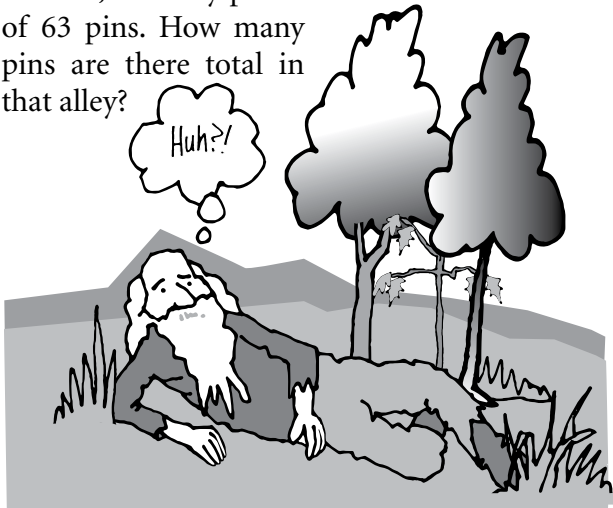
# SECONDARY PROBLEM BOX

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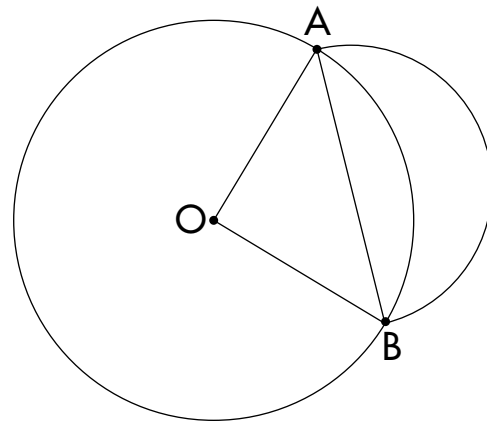
16-5

Rip Van Winkle awakens to hear sounds of bowling; LOUD sounds of bowling! He observes that some small forest creatures have fashioned a bowling alley with a large triangle of pins at the end, so many pins that the last row consists of 63 pins. How many pins are there total in that alley?



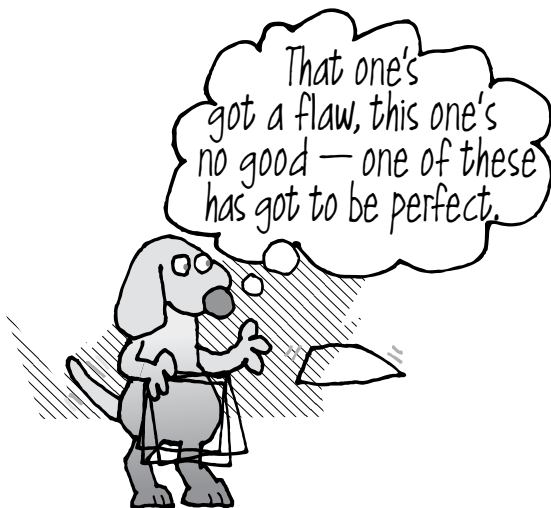
16-7

In a circle with right angle AOB, a semicircle is constructed, whose diameter is AB. The portion of the semicircle that is outside circle O is called a "lune." What is the ratio of the area of the lune to the area of triangle AOB?



16-6

Find 4 distinct positive integers so that the sum of any three of them is a perfect square.



16-8

For what natural number values of  $n$  does the expression  $(2016 + \frac{1}{2})^n + (2017 + \frac{1}{2})^n$  represent an integer?

