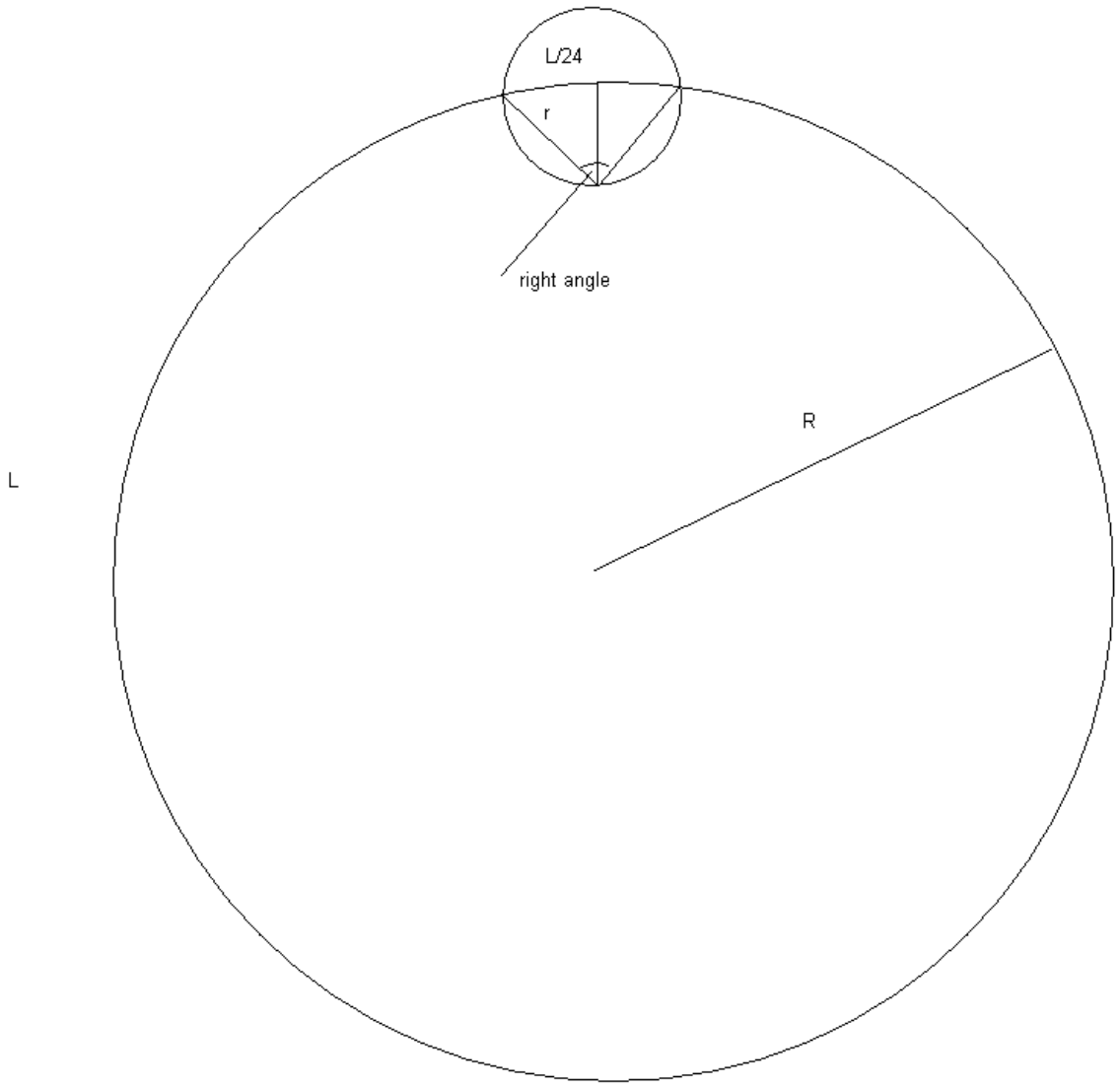
24 soda drink cans is used to form a Circumference of a circle, how many cans is needed to fill area of the circle (including the 24 of can Circumference of the circle formed)? What about 23 cans Circumference of a circle?

Solution:



R – radius of circle

r - radius of can

L – length of circle.

To fill area of circle we need $\frac{S}{s} - 12$ cans, because $12 = \frac{24}{2}$ and 24 is used to form a Circumference of a circle.

S – area of circle, s – area of circle of can.

$$\frac{S}{s} = \frac{\pi R^2}{\pi r^2} = (\frac{R}{r})^2$$

From the figure we see that $\frac{L}{24} = r\frac{\pi}{2} \rightarrow r = \frac{L}{12\pi}$ and $R = \frac{L}{2\pi}$. So

$$\frac{S}{s} = \left(\frac{R}{r}\right)^2 = \left(\frac{\frac{L}{2\pi}}{\frac{L}{12\pi}}\right)^2 = 36.$$

To fill area we need 36-12=24 cans.

Answer: 24 cans.