Answer on Question #37923, Math, Calculus.

Problem.

A prison guard tower sits 100 yards from a jail and shines a light across the jail yard at 5 revolutions each minute. This is equivalent to 12 pi radians/minute. How quickly is the spot of light moving across the jail yard when it is 50 yards from the point on the jail yard which is nearest the guard tower?

Solution.

The light shines by a circle with radius (100 – 50) = 50 yards. The length of this circle is $2 \cdot \pi \cdot 50 \quad = 100\pi$. It shines at 5 revolutions each minute, so it is $5 \cdot 100\pi = 500 \cdot \pi \frac{yards}{minute}$.

Answer.

$500 \cdot \pi \frac{yards}{minute}$.