$$s = \frac{4 - K + \sqrt{K^2 - 8K}}{2} = \frac{4 - K + K\sqrt{1 - 8/K}}{2} = \frac{4 + K\left(\sqrt{1 - 8/K} - 1\right)}{2}$$

Using the binomial series

$$\left(1 + w\right)^{\alpha} = 1 + \alpha w + \frac{\alpha\left(\alpha - 1\right)}{2!} w^2 + \frac{\alpha\left(\alpha - 1\right)\left(\alpha - 2\right)}{3!} w^3 + \cdots \quad , \quad -1 < w < 1$$

with $\alpha = 1/2$ and $w = -8/K$ and for $K > 8$,

$$\left(1 - 8/K\right)^{\alpha} = \sqrt{1 - 8/K} = 1 + \left(1/2\right)\left(-8/K\right) + \frac{-1/4}{2!}\left(-8/K\right)^2 + \frac{3/8}{3!}\left(-8/K\right)^2 + \cdots$$

$$\left(1 - 8/K\right)^{\alpha} = \sqrt{1 - 8/K} = 1 - 4/K - 8/K^2 - 32/K^3 + \cdots$$

$$s = \frac{4 + K\left(\left(1 - 4/K - 8/K^2 - 32/K^3 + \cdots\right) - 1\right)}{2}$$

$$s = \frac{4 + \left(-4 - 8/K - 32/K^2 + \cdots\right)}{2}$$

$$\lim_{K \to \infty} s = \lim_{K \to \infty} \frac{4 + \left(-4 - 8/K - 32/K^2 + \cdots\right)}{2} = 0$$