Question

The average life of a small motor is 10 years with a standard deviation of 2 years. The manufacturer replaces free all motors that fail while under guarantee. If the manufacturer is willing to replace only 3% of the motors that fail, how long a guarantee should he offer? Assume lifetimes are normally distributed.

Solution

$$Z = \frac{X - \mu}{\sigma}$$

We have that $\mu = 10, \sigma = 2$.

A z −value of -1.88 corresponds to 3% of area under the curve. Then

$$-1.88 = \frac{X - 10}{2}$$

Solve for X

$X = 10 - 1.88 \cdot 2 = 6.24$ years (approximately 6 years 88 days).

Answer: 6.24 years.