$$f(t) = \begin{cases} 0.000375\,t^2 & \text{for } 0 \le t \le 20 \\ 0 & \text{otw} \end{cases}$$

$$R(t) = \int_t^{\infty} f(\hat{t})\, d\hat{t}$$

$$= \int_t^{20} 0.000375\,\hat{t}^2\, d\hat{t} + \int_{20}^{\infty} 0 \; d\hat{t}$$

$$= \left[\frac{0.000375\,\hat{t}^3}{3} \right]_t^{20} = \frac{0.000375}{3}\,(20^3 - t^3)$$

$$MTTF = \int_0^{\infty} R(t)\, dt$$

$$= \int_0^{20} \frac{0.000375}{3}\,(20^3 - \hat{t}^3)\, d\hat{t}$$

$$= \frac{0.000375}{3} \left[20^3 \hat{t} - \frac{\hat{t}^4}{4} \right]_0^{20}$$

$$= 15$$