10. $\frac{dR}{dx} = 50 - 4x$, $x = 20$

$$\int_{20}^{23} (50 - 4x)\, dx$$

$$= \left[50x - \frac{4}{2}x^2 \right]_{20}^{23}$$

$$= \left[50x - 2x^2 \right]_{20}^{23}$$

$$= \left(50(23) - 2(23)^2 \right) - \left(50(20) - 2(20)^2 \right)$$

$$= 92 - 200$$

$$= \boxed{-108}$$