

An average young female in the United States gains weight at the rate of

$$14(x - 10)^{-1/2}$$

pounds per year, where x is her age ($10 < x < 19$) find the total weight gain from age 11 to 19.

Solution:

We have

$$\begin{aligned} w &= \int_{11}^{19} 14(x - 10)^{-1/2} dx = 14 \int_{11}^{19} (x - 10)^{-1/2} d(x - 10) = 14 \cdot \frac{(x - 10)^{-1/2+1}}{-1/2 + 1} \bigg|_{11}^{19} = \\ &= 28 \cdot (x - 10)^{1/2} \bigg|_{11}^{19} = 28 \cdot \left((19 - 10)^{1/2} - (11 - 10)^{1/2} \right) = \\ &= 28 \cdot \left((9)^{1/2} - (1)^{1/2} \right) = 28 \cdot (3 - 1) = 56 \text{ (pounds)} \end{aligned}$$

Answer:

$$56 \text{ (pounds)}$$