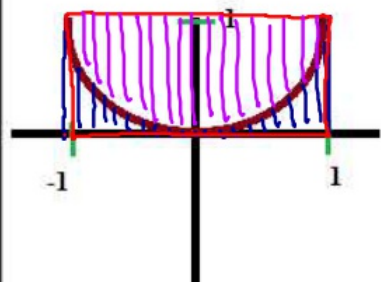


Find the average value of the function without integrating.

Geometry

16.  $f(x) = 1 - \sqrt{1 - x^2}$



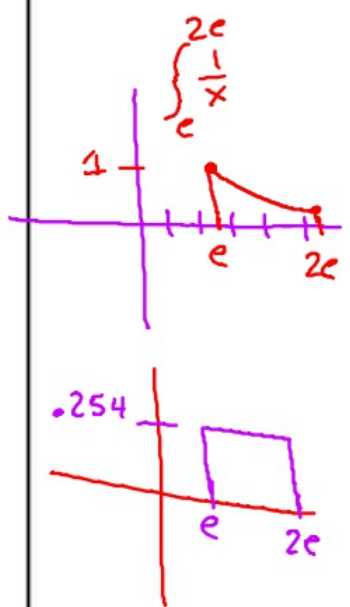
Area Rectangle = 2  
 Area  $\frac{1}{2}$  circle =  $\frac{1}{2}\pi(1)^2$

$$\begin{aligned} \text{Avg Value} &= \frac{\text{Area}}{\text{width}} \\ &= \frac{\int_{-1}^1 f(x) dx}{1 - (-1)} \\ &= \frac{2 - \frac{1}{2}\pi}{2} \\ &= 1 - \frac{\pi}{4} \end{aligned}$$

Find the avg value using antiderivatives

32.  $y = \frac{1}{x}$   $[e, 2e]$

$$\begin{aligned} \text{Avg Value} &= \frac{\int_e^{2e} \frac{1}{x}}{2e - e} = \frac{\ln x \Big|_e^{2e}}{e} = \frac{\ln(2e) - \ln e}{e} \\ &= \frac{\ln(2e) - 1}{e} \\ &= \frac{\ln 2 + \ln e - 1}{e} \end{aligned}$$



7 | Page  $\frac{1}{e} \int_e^{2e} \frac{1}{x} = \frac{\ln 2}{e} = 0.254$

$$= \frac{\ln 2}{e}$$