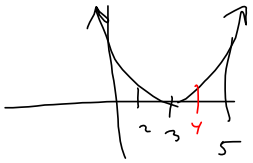
5.5 #9

(a) $f(x) = (x-3)^2 \quad [a,b] = [2,5]$

$$f_{avg} = \frac{1}{5-2}\int_2^5 (x-3)^2\,dx = \frac{1}{3}\left[\frac{1}{3}(x-3)^3\right]_2^5$$

$$= \frac{1}{3}\left[(5-3)^3 - (2-3)^3\right] = \frac{1}{3}\left[8+1\right] = 3$$



(b) Set $f(x) = 3$

$$(x-3)^2 = 3$$

$$x-3 = \pm\sqrt{3}$$

$$x = 3 \pm \sqrt{3}$$

$3+\sqrt{3} = 4.7 = c$

$3-\sqrt{3} = 1.2$

$$(f_{avg})(b-a) = f(4)(5-2) = \int_2^5 (x-3)^2\,dx$$

$$f_{avg} = f(4) = \frac{1}{5-2}\int_2^5 (x-3)^2\,dx$$

MVT

$$\frac{f(b)-f(a)}{b-a} = m_{avg} = f'(c)$$

$$f(b)-f(a) = f'(c)(b-a)$$