15.49

Καταρχήν έχουμε

$$f\left(x^2\right)=f\left(x\right)\overset{\text{παραγωγίζουμε}}{\Rightarrow}2xf'\left(x^2\right)=f'\left(x\right)\overset{x=1}{\Rightarrow}2\cdot1\cdot f'\left(1\right)=f'\left(1\right)\Rightarrow f'\left(1\right)=0$$

Επομένως

$$\boxed{\lim_{x\to1}\frac{xf\left(x\right)-2}{x-1}}\overset{\text{προσθαφαιρούμε } xf(1)}{=}\lim_{x\to1}\frac{xf\left(x\right)-xf\left(1\right)+xf\left(1\right)-2}{x-1}=$$

$$=\lim_{x\to1}\frac{xf\left(x\right)-xf\left(1\right)}{x-1}+\lim_{x\to1}\frac{xf\left(1\right)-2}{x-1}\overset{f(1)=2}{=}\lim_{x\to1}\frac{x\left[f\left(x\right)-f\left(1\right)\right]}{x-1}+\lim_{x\to1}\frac{2x-2}{x-1}=$$

$$=\lim_{x\to1}x\cdot\lim_{x\to1}\frac{f\left(x\right)-f\left(1\right)}{x-1}+\lim_{x\to1}\frac{2\cancel{\left(x-1\right)}}{\cancel{x-1}}=1\cdot f'\left(1\right)+2\overset{f'(1)=0}{=}\boxed{2}$$