

52. Let $f(1) = -2$ and $f'(x) \geq 4.2$ for $1 \leq x \leq 6$. The possible value of $f(6)$ lies in the interval : **[April 25, 2013]**

(a) $[15, 19)$ (b) $(-\infty, 12)$

(c) $[12, 15)$ (d) $[19, \infty)$

(d) Given $f(1) = -2$ and $f'(x) \geq 4.2$ for $1 \leq x \leq 6$

$$\text{Consider } f'(x) = \frac{f(x+h) - f(x)}{h}$$

$$\Rightarrow f(x+h) - f(x) = f'(x) \cdot h \geq (4.2)h$$

$$\text{So, } f(x+h) \geq f(x) + (4.2)h$$

put $x = 1$ and $h = 5$, we get

$$f(6) \geq f(1) + 5(4.2) \Rightarrow f(6) \geq 19$$

Hence $f(6)$ lies in $[19, \infty)$