Taller 10

1. $f(x) = 0,35x^4 - 0,45x^2 + 4,8$, $x = 1,1$, $h = 0,1$

$x_i = 1,1$ $f(1,1) = 4,767935$ $f'(1,1) = 0,8734$

$x_{i+1} = 1,2$ $f(1,2) = 4,87776$ $f''(1,1) = 4,182$

$x_{i+2} = 1,3$ $f(1,3) = 5,039135$

$x_{i-1} = 1$ $f(1) = 4,7$

$x_{i-2} = 0,9$ $f(0,9) = 4,665135$

- hacia adelante:

$$f'(1,1) = \frac{f(x_{i+1}) - f(x_i)}{h} = \frac{4,87776 - 4,767935}{0,1} = 1,09825$$

$$f''(1,1) = \frac{f(x_{i+2}) - 2f(x_{i+1}) + f(x_i)}{h^2} = \frac{5,039135 - 9,75552 + 4,767935}{0,01} = 5,155$$

- hacia atras:

$$f'(1,1) = \frac{f(x_i) - f(x_{i-1})}{h} = \frac{4,767935 - 4,7}{0,1} = 0,67935$$

$$f''(1,1) = \frac{f(x_i) - 2f(x_{i-1}) + f(x_{i-2})}{h^2} = \frac{4,767935 - 9,4 + 4,665135}{0,01} = 3,307$$

- centrado:

$$f'(1,1) = \frac{f(x_{i+1}) - f(x_{i-1})}{2h} = \frac{4,87776 - 4,7}{0,2} = 0,8888$$

$$f''(1,1) = \frac{f(x_{i+1}) - 2f(x_i) + f(x_{i-1})}{h^2} = \frac{4,87776 - 9,53587 + 4,7}{0,01} = 4,189$$

2. $f(x) = 0,35x^4 - 0,45x^2 + 4,8$ $x = 1,1$ $h = 0,05$

$x_i = 1,1$ $f(1,1) = 4,767935$ $f'(1,1) = 0,8734$

$x_{i+1} = 1,15$ $f(1,15) = 4,817027188$ $f''(1,1) = 4,182$

$x_{i-1} = 1,05$ $f(1,05) = 4,729302188$

$$f'(1,1) = \frac{f(x_{i+1}) - f(x_{i-1})}{2h} = \frac{4,817027188 - 4,729302188}{0,1} = 0,87725$$

$$f''(1,1) = \frac{f(x_{i+1}) - 2f(x_i) + f(x_{i-1})}{h^2} = \frac{4,8170 - 9,53587 + 4,7293}{0,0025} = 4,1837504$$

- conclusión: son más cercanos al valor verdadero.