MCQ

① stores the number

② -15.5 & +15.5

③ values of e

④ saves ~~the number~~ storage & unique representation

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⑤

Time (s)	3	5
Distance (m)	225	383
Speed (ms^{-1})	77	80

$$P_3(x) = f(x_0)h_0(x) + f(x_1)h_1(x) + f'(x_0)\hat{h}_0(x) + f'(x_1)\hat{h}_1(x)$$

$$l_0 = \frac{x - x_1}{x_0 - x_1} = \frac{x-5}{3-5} = \boxed{-\frac{1}{2}x + \frac{5}{2}}$$

$$\boxed{l_0' = -\frac{1}{2}}$$

$$l_1 = \frac{x - x_0}{x_1 - x_0} = \frac{x-3}{5-3} = \boxed{\frac{1}{2}x - \frac{3}{2}}$$

$$\boxed{l_1' = \frac{1}{2}}$$

$$h_k(x) = \left(1 - 2(x - x_k)l_k'(x_k)\right)l_k^2(x)$$

$$h_0(x) = \left(1 - 2(x-3)l_0'(x_0)\right)l_0^2(x)$$

$$= \left(1 - 2(x-3)\left(-\tfrac{1}{2}\right)\right)\left(-\tfrac{1}{2}x + \tfrac{5}{2}\right)^2$$

$$= \left(1 + x - 3\right)\left(-\tfrac{1}{2}x + \tfrac{5}{2}\right)^2$$

$$\boxed{= (x-2)\left(-\tfrac{1}{2}x + \tfrac{5}{2}\right)^2}$$

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$$h_1(x) = (1-2(x-5)\tfrac{1}{2})\ (\tfrac{1}{2}x-\tfrac{3}{2})^2$$

$$= (1-x+5)\ (\tfrac{1}{2}x-\tfrac{3}{2})^2$$

$$\boxed{= (-x+6)\ (\tfrac{1}{2}x-\tfrac{3}{2})^2}$$

$$\hat{h}_k(x) = (x-x_k)\ l_k^2$$

$$\hat{h}_0(x) = (x-x_0)\ (-\tfrac{1}{2}x+\tfrac{5}{2})^2$$

$$\boxed{= (x-3)\ (-\tfrac{1}{2}x+\tfrac{5}{2})^2}$$

$$\hat{h}_1(x) = (x-x_1)\ (\tfrac{1}{2}x-\tfrac{3}{2})^2 = \boxed{(x-5)\ (\tfrac{1}{2}x-\tfrac{3}{2})^2}$$

$$2n+1 = 2\times 1+1 = 3$$

$$P_3(x) = (225)\ (x-2)(-\tfrac{1}{2}x+\tfrac{5}{2})^2 + (383)(-x+6)(\tfrac{1}{2}x-\tfrac{3}{2})^2$$

$$+ (77)\ (-\tfrac{1}{2}x+\tfrac{5}{2})^2 + (80)\ (x-5)(\tfrac{1}{2}x-\tfrac{3}{2})^2$$
$$(x-3)$$

$$\boxed{P_3(4) = 303.25\ m}$$

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