

Solutions Calculus Exercise 1

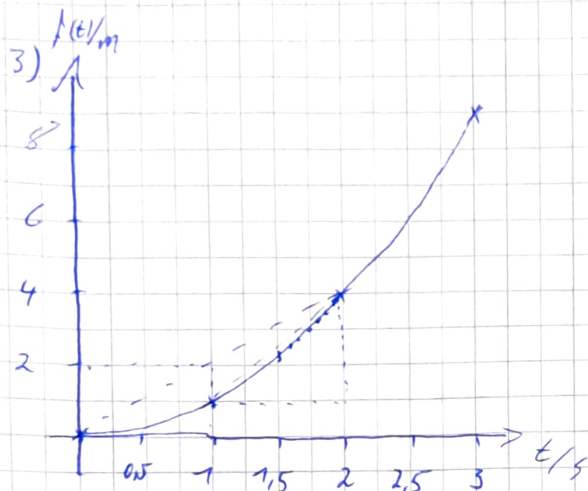
1)

$$f(4) - f(3) = 30\text{m} - 20\text{m} = 10\text{m}$$

2) $f(5\text{s}) - f(3\text{s}) = 30\text{m} - 20\text{m} = 10\text{m}$

$$\frac{\Delta f}{\Delta t} = \frac{10\text{m}}{1\text{s}} = 10 \text{ m/s}$$

$$\frac{\Delta f}{\Delta t} = \frac{10\text{m}}{2\text{s}} = 5 \text{ m/s}$$



$$f(0) = 0$$

$$f(1) = 2$$

$$f(2) = 4$$

$$f(3) = 8$$

$$\frac{f(2) - f(0)}{2 - 0} = 2$$

$$\frac{f(2) - f(1)}{2 - 1} = 3$$

Solutions Calculus Exercise 2

1)

a) $f(x) = 7x^4$ $f'(x) = 28x^3$

b) $g(x) = 2x^4 + 3x^3 + x^2 + 70x + 5$

$$g'(x) = 8x^3 + 9x^2 + 2x + 70$$

c) $h(x) = 4e^{3x}$ $h'(x) = 12e^{3x}$

d) $i(x) = (12x^2 + 5)3x^3$

$$i'(x) = \frac{d(12x^2 + 5)}{dx} 3x^3 + (12x^2 + 5) \frac{d(3x^3)}{dx}$$

$$= 24x 3x^3 + (12x^2 + 5) 9x^2$$

$$= 180x^4 + 45x^2$$

2)

$$h(x) = 6x^2 + 3x + 2$$

$$h'(x) = 12x + 3 \stackrel{!}{=} 0$$

$$\Rightarrow x = -\frac{3}{12} = -\frac{1}{4}$$

e) $j(x) = \frac{3x}{\cos(x)}$

$$j'(x) = \frac{3}{\cos(x)} + (3x) \left(-\frac{1}{\cos^2(x)} \right) (-\sin(x))$$

$$= \frac{3}{\cos(x)} + \frac{3x \sin(x)}{\cos^2(x)}$$

$$= \frac{3x \tan(x) + 3}{\cos(x)}$$