$$F(x) = ?$$

$$F'(x) = x^2$$

$$\Rightarrow F(x) = \frac{1}{3}x^3 + C$$

arbitrary constant

integration

differentiation

$F(x)$ $\quad F'(x) = f(x) \quad f'(x)$

$\downarrow$

anti-derivative

$$\int f(x)\,dx = F(x) + C$$

integral sign

integrand

indicate the variable of integration

$$\int 3x^2\,dx = x^3 + C$$

$$\int x^3\,dx = \frac{1}{4}x^4 + C$$

$$\int x^{99}\,dx = \frac{1}{100}x^{100} + C$$

$$\int \frac{1}{x^3}\,dx = \int x^{-3}\,dx$$

$$= \frac{1}{-3+1} x^{-3+1} + C = -\frac{1}{2x^2} + C$$

$$\int 4x^2\,dx = 4\int x^2\,dx$$

$$= 4\cdot\left(\frac{1}{3}x^3\right) + C$$

$$\int 4x - 3x^2\,dx = 2x^2 - x^3 + C$$

$$\varphi(A) = \int 4{,}5\, A^{-1/3}\, dA$$

$$= 4{,}5 \cdot \frac{3}{2} A^{2/3} + C$$

$$= 6{,}75\, A^{2/3} + C$$

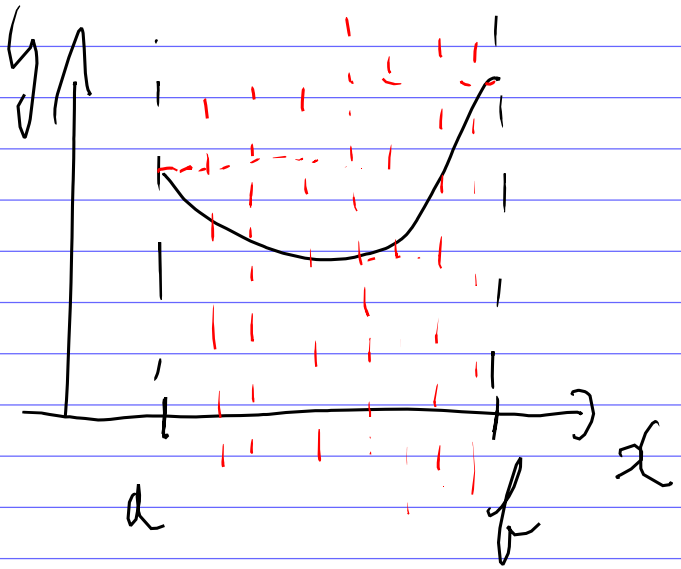
We know that $G(0) = 6{,}75 \times 0^{2/3} + C$

$= 80$

So $C = 80$

And $G(8) = 6{,}75 \times 8^{2/3} + 80$

$= 107$

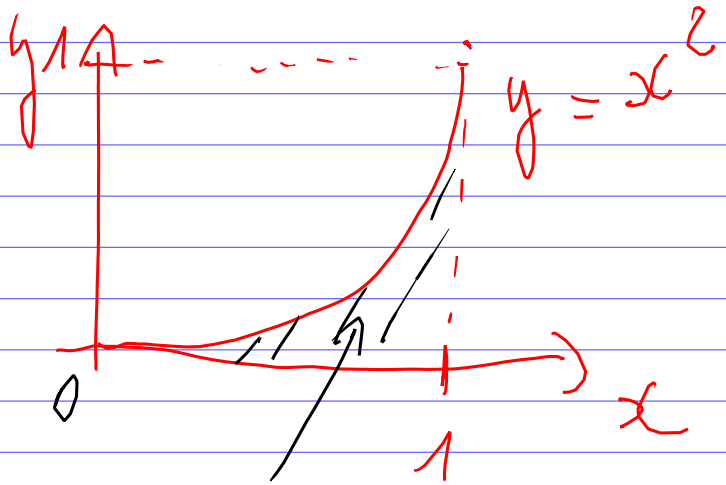

y
x
a
b

$$f(t)\cdot \Delta t \leq A(t+\Delta t) - A(t)$$

$$\leq f(t+\Delta t)\cdot \Delta t$$

$$f(t) \leq \frac{A(t+\Delta t)-A(t)}{\Delta t} \leq f(t+\Delta t)$$

$\Rightarrow$ NEWTON QUOTIENT



A?

$$\int_0^1 f(x)\,dx = \int_0^1 x^2\,dx$$

$$\int_0^1 \frac{1}{3} x^3 = F(1) - F(0)$$

$$= \frac{1}{3} \cdot 1 - \frac{1}{3} \cdot 0 = \frac{1}{3}$$

$$MC = \frac{75}{\sqrt{x}}$$

Cost of producing units 100 to 400:

$$\int_{100}^{400} \frac{75}{\sqrt{x}}\, dx$$

$$= 75 \times \int_{100}^{400} \frac{75}{\sqrt{x}}\, dx$$

$$= 75 \cdot \int_{100}^{400} x^{-1/2} \, dx$$

$$= 75 \Big|_{100}^{400} 2x^{1/2}$$

$$= 75 \times \left(2 \times 400^{1/2} - 2 \cdot 100^{1/2} \right)$$

$$= 1500$$