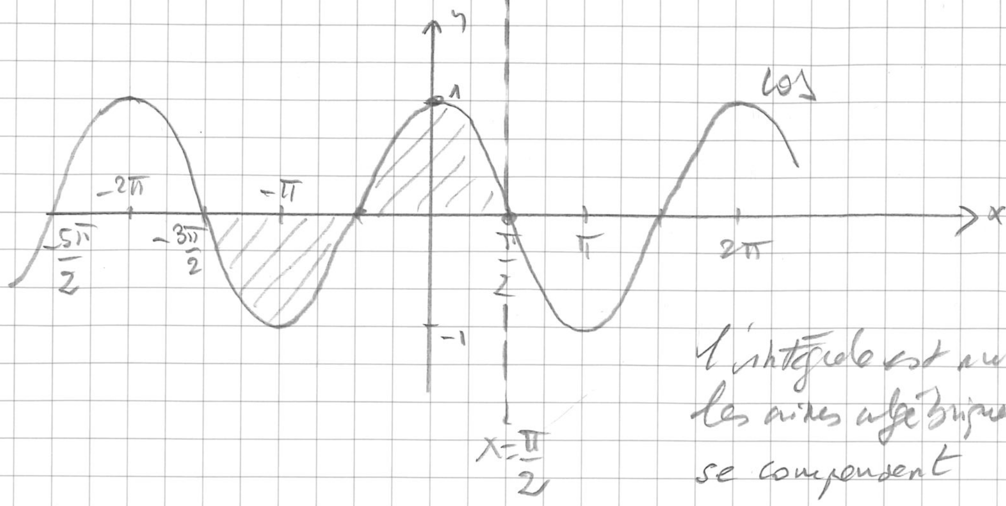
## ex12




l'intégrale est nulle, donc les aires algébriques $\geq 0$ et $\leq 0$ se compensent

$a = -\frac{3\pi}{2}$, ou $a = -\frac{7\pi}{2}$ ou ...

## ex13

cf ex1 :

a) $I = A = 8$

b) $I = 0$

c) $I = \int_2^4 f(x)\,dx = \left(\frac{4+2}{2}\right)\cdot 2 = 6$ (aire d'un trapèze)

d) $I = A = 16$

e) $I = -A = -20$

f) $A = 0$

g) $I = A = 8$

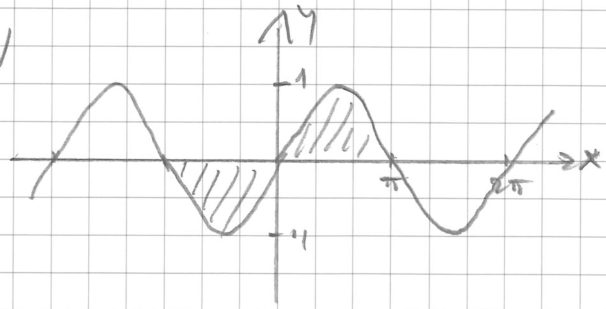
h) $I = A = 4$

i) $I = A = 2\pi$

j) $I = -A = -4\pi$

k) $I = A = \pi + 10$

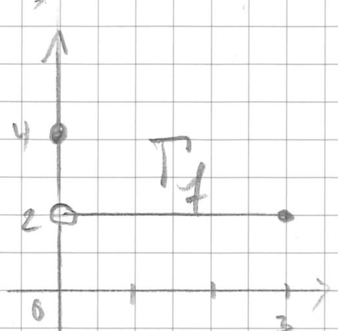
l)




$I = 0$

## ex14

a)




b) $\Delta x = 3/n$

$x_0 = 0$

$x_1 = \frac{3}{n} = 1\cdot\frac{3}{n}$

$x_2 = \frac{6}{n} = 2\cdot\frac{3}{n}$

$\vdots$

$x_{n-1} = (n-1)\frac{3}{n}$

$x_n = n\cdot\frac{3}{n} = 3$

c) $m_1 = m_2 = \dots = m_n = 2$

$M_1 = 4$ ; $M_2 = \dots = M_n = 2$

$s_n = \underbrace{\frac{3}{n}\cdot 2 + \dots + \frac{3}{n}\cdot 2}_{n \text{ fois}} = n\cdot\frac{3}{n}\cdot 2 = 6$

$S_n = \frac{3}{n}\cdot 4 + \underbrace{\frac{3}{n}\cdot 2 + \dots + \frac{3}{n}\cdot 2}_{(n-1) \text{ fois}} = \frac{12}{n} + (n-1)\frac{3}{n}\cdot 2 = \frac{12 + 6(n-1)}{n}$

$\lim_{n\to\infty} s_n = 6$ et $\lim_{n\to\infty} S_n = \lim_{n\to\infty} \frac{n(6+6/n)}{n} = 6$

donc $\int_0^3 f(x)\,dx = 6$

ex 15

a) $(3x^4 + x^2)' = 3 \cdot 4x^3 + 2x = 12x^3 + 2x$

b) $(\sqrt{x})' = \frac{1}{2\sqrt{x}}$

c) $(x^3 - 2x^2 + x)' = 3x^2 - 4x + 1$

d) $[\sin(x)\cos(x)]' = \cos(x)\cos(x) + \sin(x)(-\sin(x)) = \cos^2(x) - \sin^2(x)$

e) $[\sqrt{x}\,\sin(x)]' = \frac{1}{2\sqrt{x}}\sin(x) + \sqrt{x}\cos(x)$

f) $\left(\frac{x^2+5}{x^3+2x}\right)' = \frac{2x(x^3+2x) - (x^2+5)(3x^2+2)}{(x^3+2x)^2}$

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

h) $(\sqrt{-2x})' = \frac{1}{2\sqrt{-2x}} \cdot (-2x)' = \frac{1}{2\sqrt{-2x}}(-2) = \frac{-1}{\sqrt{-2x}}$

i) $(\sin(3x))' = \cos(3x) \cdot (3x)' = 3\cos(3x)$

j) $\left(\sqrt{8x^2-2x+3}\right)' = \frac{1}{2\sqrt{8x^2-2x+3}} \cdot (16x^2-2) = \frac{8x^2-1}{\sqrt{8x^2-2x+3}}$