$$3x^5+4x^4-2x^3+x^2+1 \quad \Big| \quad x-2$$

	3	4	-2	1	0	1
2		6	20	36	74	148
	3	10	18	37	74	149

```
p=[1, 0, 1, -2, 4, 3]

q = p[:]
i = (len(p) - 1) - 1
while i >= 0:
    q[i] += q[i+1] * 2
    i = i - 1
```

```
return q[1:], q[0]
```

$6x^7-5x^6-113x^5+43x^4+499x^3-230x^2-392x+192$

$$\boxed{3x^5+4x^4-2x^3+x^2+1} \;\Big|\; \underline{x-2}$$

	3	4	-2	1	0	1
2		6	20	36	74	148
	3	10	18	37	74	149

$\cdot 2$

p = [1, 0, 1, -2, 4, 3]

q = p[:]

Slicing

[1, 0, 1, -2, 4, 3]

$\boxed{4+2*3} = 10$

[1, 0, 1, -2, 10, 3]

$i = \underbrace{(\mathrm{len}(p)-1)}_{\text{indice du dernier élem.}}-1$

while i >= 0:

i = i - 1

On veut l'élément avant dernier

$[1, 0, 1, -2+10*2, 10, 3]$

$p = [3, 2, -2, 4]$

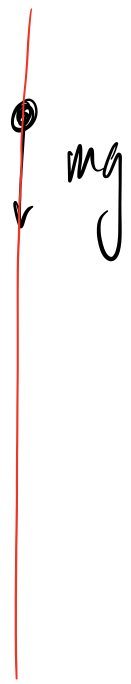
$\quad\; 0 \quad 1 \quad 2 \quad 3$

$len(p) = 4$

$p[len(p)-1] = p[3]$

MRUA

$F = m \cdot a$



$$mg = ma$$

$$a = g$$

$$\boxed{a(t) = g}$$

dérivée

dérivée

$$x(t) = x_0 + v_0 t + \frac{1}{2} g t^2$$ position

$$v(t) = v_0 + g t$$ vitesse

$$a(t) = g$$

$$\boxed{\begin{aligned} \frac{d}{dt}\left(x(t)\right) &= v(t) \\ \frac{d}{dt}\left(v(t)\right) &= a(t) \end{aligned}}$$

$$\frac{d}{dt}(g \cdot t) = g$$

dérivée

$$\frac{d}{dt}\left(x_0 + v_0 t + \frac{1}{2} g t^2\right) = v_0 + g t$$

déf. $\frac{d}{dt}(t^n) = n \cdot t^{n-1} = (t^n)'$

et $\boxed{\frac{d}{dt}(c) = 0}$

Exemple: $(t^2)' = 2t$ $\qquad t' = 1$

$(t^3)' = 3t^2$ $\qquad 4' = 0$

déf. $\frac{d}{dt}(p+q) = \frac{d}{dt}p + \frac{d}{dt}q$

$\frac{d}{dt}(k \cdot p) = k \cdot \frac{d}{dt}p$

Exemple: $\frac{d}{dt}\left(x_0 + v_0 t + \frac{1}{2}gt^2\right) =$

$\frac{d}{dt}x_0 + \frac{d}{dt}(v_0 \cdot t) + \frac{d}{dt}\left(\frac{1}{2}gt^2\right) =$

$\frac{d}{dt}x_0 + v_0 \frac{d}{dt}t + \frac{1}{2}g \frac{d}{dt}(t^2) =$

$$0 + v_0 \cdot 1 + \frac{1}{2} g \cdot 2t^1 =$$

$$v_0 + gt$$

$$\frac{d}{dt}(v_0 + gt) = 0 + g = g$$

<u>Propriété:</u> $\frac{d}{dt}(p \cdot q) = \frac{d}{dt}p \cdot q + p \cdot \frac{d}{dt}q$

$$\boxed{(p \cdot q)' = p' \cdot q + p \cdot q'}$$

A vérifier

En Python

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

$(1)' = 0$

$(3x)' = 3$

$p = [1, 3, -2, 0, 3]$

$\frac{d}{dx} p = p' = [3, 2\cdot(-2), 0, 4\cdot 3] = [3, -4, 0, 12]$

$(x^2)' = 2x$

$p = [\cancel{1}, 3, -2, 0, 3]$

$= \underbrace{[1\cdot 3, 2\cdot(-2), 3\cdot(0), 4\cdot(3)]}_{p'}$

$(3x^4 - 2x^2 + 3x + 1)' = 3\cdot 4\cdot x^3 - 2\cdot 2\cdot x^1 + 3 + 0$

$(3x^5 + 4x^2 + 1)' = 3\cdot 5\cdot x^4 + 4\cdot 2\cdot x^1 + 0$

12/01/2026

- Horner à finir
- Ecrire la fonction derivee