Ex 95

$f(x) = 2e^{2x} - 5e^{x} + 2 \qquad I = \mathbb{R}$

$f'(x) = 4e^{2x} - 5e^{x}$ Signe de f' : $4e^{2x} - 5e^{x} > 0 \Rightarrow e^{x}(4e^{x} - 5) > 0$

$e^{x} > 0$	$4e^{x} - 5 > 0$
Toujours	$4e^{x} > 5$
	$e^{x} > 5/4$
	$x > \ln\left(\frac{5}{4}\right)$

Tableau de variations :

x	$-\infty$		$\ln(5/4)$		$+\infty$
f'		$-$	0	$+$	
f		$\searrow$	$f(\ln(5/4))$	$\nearrow$	

$$f\left(\ln\left(\frac{5}{4}\right)\right) = 2e^{2\ln\left(\frac{5}{4}\right)} - 5e^{\ln\left(\frac{5}{4}\right)} + 2$$
$$= 2e^{\ln\left(\frac{5}{4}\right)^2} - 5 \times \frac{5}{4} + 2$$
$$= 2 \times \frac{25}{16} - \frac{25}{4} + 2 =$$
$$= \frac{25}{8} - \frac{25}{4} + 2 = \frac{25 - 50 + 16}{8} = -\frac{9}{8}$$

Ex 96

$f(x) = 45x^2 - x^3 \qquad I = [0; 40]$

$f'(x) = 50x - 3x^2$ Signe de f' : $50x - 3x^2 > 0 \Rightarrow x(-3x + 50) > 0$

$x > 0$	$-3x + 50 > 0$
	$3x < 50$
	$x < \frac{50}{3}$

x	0		$50/3$		40
x		$+$		$+$	
$-3x+50$		$+$	0	$-$	

Tableau de variations :

x	0		$50/3$		40
f'		$+$	0	$-$	
f		$\nearrow$	$f(50/3)$	$\searrow$	

$$f\left(\frac{50}{3}\right) = 45 \times \frac{2500}{9} - \frac{125000}{27} =$$
$$= \frac{337500 - 125000}{27} = \frac{212500}{27}$$
$$\simeq 7870{,}37$$

Ex 97

$f(x) = x^3 - 24x^2 + 144x \qquad I = [0; 12]$

$f'(x) = 3x^2 - 48x + 144$ Signe de f' : $3x^2 - 48x + 144 > 0 \Rightarrow \Delta = (-48)^2 - 4 \times 3 \times 144 = 576$

$\Rightarrow x_1 = \frac{48 - 24}{6} = 4 \qquad x_2 = \frac{48 + 24}{6} = 12$

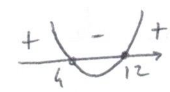

Tableau de variations :

x	0		4		12
f'		$+$	0	$-$	
f	0	$\nearrow$	256	$\searrow$	0

$f(4) = 4^3 - 24 \times 4^2 + 144 \times 4 = 256$

$f(0) = 0$

$f(12) = 0$