Exercice #1

Translate into french :

1. The modulus of a real negative number is positive and the only number which modulus is equal to 0 is 0 itself.

2. When the discriminant of the quadratic equation $-x^2+Bx+C=0$ is negative, the solution set of the inequality $-x^2+Bx+C>0$ is the empty set.

3. The sum and the product of the roots of a quadratic equation can easely be calculated from the coefficients of this equation.

4. When a is negative, the quadratic function $f:x\mapsto ax^2+bx+c$ is strictly increasing on $\left]-\infty\,;-\dfrac{b}{2a}\right]$ and strictly decreasing on $\left[-\dfrac{b}{2a}\,;+\infty\right[$. Thus, it has a global maximum for $x=-\dfrac{b}{2a}$.

Exercice #2

Translate into english :

1. La courbe représentative d'une fonction paire est symétrique par rapport à l'axe des ordonnées.

2. Une fonction affine peut être strictement décroissante, strictement croissante ou constante.

3. La fonction valeur absolue n'est ni croissante ni décroissante sur $\mathbb{R}$.

4. L'abscisse du sommet de la parabole d'équation $y=ax^2+bx+c$ vaut $-\dfrac{b}{2a}$.

Exercice #3

For which values of the parameter *a* does the quadratic equation

$$(a+2)x^2-(3a+1)x+(a+1)=0$$

have two real roots ?

Exercice #4

If α and β are the roots of the equation $3x^2-12x+11=0$ (**DO NOT** calculate them !), find the values of :

$$\alpha+\beta,\ \alpha\beta,\ \alpha^2+\beta^2,\ \frac{1}{2\alpha}+\frac{1}{2\beta},\ \frac{\beta}{\alpha-2}+\frac{\alpha}{\beta-2}$$

$$\sqrt{\alpha}+\sqrt{\beta}\ \text{(considering } \left(\sqrt{\alpha}+\sqrt{\beta}\right)^2 \text{ may be helpfull…) and } \frac{\sqrt{\beta}}{\beta+1}+\frac{\sqrt{\alpha}}{\alpha+1}$$

Exercice #5

Let *f* be the function defined on $\mathbb{R}$ by :

$$f : x \mapsto |-2x+3|+|3x-5|$$

1. Express $f(x)$ without the modulus.
2. Sketch the graph of *f*.
3. Study the variations of *f* and show that *f* admits a strict global minimum and give the value of this minimum.