

4. Determine the sign of the following quadratic functions.

a)  $f(x) = x^2 + 2x - 15$  Positive:  $] -\infty, -5] \cup [3, +\infty[$  Negative:  $[-5, 3]$

b)  $f(x) = -2x^2 + 7x - 6$  Positive:  $[3/2, 2]$  Negative:  $] -\infty, 3/2] \cup [2, +\infty[$

c)  $f(x) = x^2 - 2x + 1$  Positive:  $\mathbb{R}$  Negative:  $\{1\}$

d)  $f(x) = -4x^2 + 4x - 1$  Positive:  $\{1/2\}$  Negative:  $\mathbb{R}$

5. Determine the domain and range of the following functions.

a)  $f(x) = -x^2 + 4x + 5$  Dom:  $\mathbb{R}$  Ran:  $] -\infty, 9]$

b)  $f(x) = x^2 + 2x - 15$  Dom:  $\mathbb{R}$  Ran:  $[-16, +\infty[$

6. Study the variation of the following functions.

a)  $f(x) = x^2 - x - 6$  Decreasing:  $] -\infty, 1/2]$  Increasing:  $[1/2, +\infty[$

b)  $f(x) = -2x^2 + 3x - 1$  Increasing:  $] -\infty, 3/4]$  Decreasing:  $[3/4, +\infty[$

7. What are the zeros of the function  $y = -3x^2 + 11x - 6$ ?  $x = \{2/3, 3\}$

8. Find the values of  $x$  for which  $f(x) = x^2 + 5x - 14$  is positive.  $] -\infty, -7] \cup [2, +\infty[$

9. What is the range of the function  $f(x) = -x^2 + 2x + 15$ ?  $] -\infty, 16]$

10. What is the y-intercept of  $y = 3x^2 - 2x + 5$ ? 5

11. Find the extrema and its nature (maximum or minimum) for  $y = -x^2 - 2x + 3$ .  
maximum = 4

12. What is the equation of the axis of symmetry for the parabola  $y = -2x^2 + 5x - 3$ ?  
 $x = 5/4$

13. For what values of  $x$  is the function  $f(x) = 2x^2 - x - 6$  decreasing?  
 $] -\infty, 1/4]$