Exercice n°1 : Dresser le tableau de variations des fonctions suivantes.

1) $f(x) = 3x^2 + 5x - 2$

2) $g(x) = -2x^2 + 4x + 8$

3) $h(x) = 6x^2 - 7x + 1$

4) $i(x) = x^2 + 3x + 2$

5) $j(x) = -5x^2 + 2x - 9$

6) $k(x) = 4x^2 - 6x + 3$

7) $l(x) = -8x^2 + 5x + 10$

8) $m(x) = 2x^2 - 4x - 7$

9) $n(x) = 9x^2 + 2x - 8$

10) $o(x) = -7x^2 - 3x + 6$

11) $p(x) = 5x^2 + 8x + 1$

12) $q(x) = -1x^2 + 9x - 4$

13) $r(x) = 10x^2 - 2x + 5$

14) $s(x) = -6x^2 + 7x - 3$

15) $t(x) = x^2 - 10x + 8$

16) $u(x) = 4x^2 + 6x + 2$

17) $v(x) = -3x^2 + 5x + 9$

18) $w(x) = 7x^2 - 1x + 10$

19) $x(x) = 2x^2 + 3x - 6$

20) $y(x) = -9x^2 + 4x + 7$

Correction

Exercice n°1 : Dresser le tableau de variations des fonctions suivantes.

1) $f(x) = 3x^2 + 5x - 2$

$$\alpha = -\frac{b}{2a} = -\frac{5}{2 \times 3} = -\frac{5}{6}$$

$$\beta = f(\alpha) = 3 \times \left(-\frac{5}{6}\right)^2 + 5 \times \left(-\frac{5}{6}\right) - 2 = -\frac{49}{12}$$

x	$-\infty$	$-\frac{5}{6}$	$+\infty$
f(x)	↘	$-\frac{49}{12}$	↗

2) $g(x) = -2x^2 + 4x + 8$

$$\alpha = -\frac{b}{2a} = -\frac{4}{2 \times (-2)} = \frac{4}{4} = 1$$

$$\beta = f(\alpha) = -2 \times 1^2 + 4 \times 1 + 8 = 10$$

x	$-\infty$	1	$+\infty$
f(x)	↗	10	↘

3) $h(x) = 6x^2 - 7x + 1$

$$\alpha = -\frac{b}{2a} = -\frac{-7}{2 \times 6} = \frac{7}{12}$$

$$\beta = f(\alpha) = 6 \times \left(\frac{7}{12}\right)^2 - 7 \times \left(\frac{7}{12}\right) + 1 = -\frac{25}{24}$$

x	$-\infty$	$\frac{7}{12}$	$+\infty$
f(x)	↘	$-\frac{25}{24}$	↗

4) $i(x) = x^2 + 3x + 2$

$$\alpha = -\frac{b}{2a} = -\frac{3}{2 \times 1} = -\frac{3}{2}$$

$$\beta = f(\alpha) = \left(-\frac{3}{2}\right)^2 + 3 \times \left(-\frac{3}{2}\right) + 2 = -\frac{1}{4}$$

x	$-\infty$	$-\frac{3}{2}$	$+\infty$
f(x)	↘	$-\frac{1}{4}$	↗

5) $j(x) = -5x^2 + 2x - 9$

$$\alpha = -\frac{b}{2a} = -\frac{2}{2 \times (-5)} = \frac{1}{5}$$

$$\beta = f(\alpha) = -5 \times \left(\frac{1}{5}\right)^2 + 2 \times \left(\frac{1}{5}\right) - 9 = -\frac{44}{5}$$

x	$-\infty$	$\frac{1}{5}$	$+\infty$
f(x)	↗	$-\frac{44}{5}$	↘

6) $k(x) = 4x^2 - 6x + 3$

$$\alpha = -\frac{b}{2a} = -\frac{(-6)}{2 \times 4} = \frac{6}{12} = \frac{3}{4}$$

$$\beta = f(\alpha) = 4 \times \left(\frac{3}{4}\right)^2 - 6 \times \left(\frac{3}{4}\right) + 3 = \frac{3}{4}$$

x	$-\infty$	$\frac{3}{4}$	$+\infty$
f(x)	↘	$\frac{3}{4}$	↗

7) $l(x) = -8x^2 + 5x + 10$

$$\alpha = -\frac{b}{2a} = -\frac{5}{2 \times (-8)} = \frac{5}{16}$$

$$\beta = f(\alpha) = -8 \times \left(\frac{5}{16}\right)^2 + 5 \times \left(\frac{5}{16}\right) + 10 = \frac{345}{32}$$

x	$-\infty$	$\frac{5}{16}$	$+\infty$
f(x)	↗	$\frac{345}{32}$	↘

8) $m(x) = 2x^2 - 4x - 7$

$$\alpha = -\frac{b}{2a} = -\frac{(-4)}{2 \times 2} = 1$$

$$\beta = f(\alpha) = 2 \times 1^2 - 4 \times 1 - 7 = -9$$

x	$-\infty$	1	$+\infty$
f(x)	↘	-9	↗

9) $n(x) = 9x^2 + 2x - 8$

$$\alpha = -\frac{b}{2a} = -\frac{2}{2 \times 9} = -\frac{1}{9}$$

$$\beta = f(\alpha) = 9 \times \left(-\frac{1}{9}\right)^2 + 2 \times \left(-\frac{1}{9}\right) - 8 = -\frac{73}{9}$$

x	$-\infty$	$-\frac{1}{9}$	$+\infty$
f(x)	↘	$-\frac{73}{9}$	↗

10) $o(x) = -7x^2 - 3x + 6$

$$\alpha = -\frac{b}{2a} = -\frac{(-3)}{2 \times (-7)} = -\frac{3}{14}$$

$$\beta = f(\alpha) = -7 \times \left(-\frac{3}{14}\right)^2 - 3 \times \left(-\frac{3}{14}\right) + 6 = \frac{177}{28}$$

x	$-\infty$	$-\frac{3}{14}$	$+\infty$
f(x)	↗	$\frac{177}{28}$	↘

11) $p(x) = 5x^2 + 8x + 1$

$$\alpha = -\frac{b}{2a} = -\frac{8}{2 \times 5} = -\frac{4}{5}$$

$$\beta = f(\alpha) = 5 \times \left(-\frac{4}{5}\right)^2 + 8 \times \left(-\frac{4}{5}\right) + 1 = -\frac{11}{5}$$

x	$-\infty$	$-\frac{4}{5}$	$+\infty$
f(x)	↘	$-\frac{11}{5}$	↗

12) $q(x) = -1x^2 + 9x - 4$

$$\alpha = -\frac{b}{2a} = -\frac{9}{2 \times (-1)} = \frac{9}{2}$$

$$\beta = f(\alpha) = -\left(\frac{9}{2}\right)^2 + 9 \times \left(\frac{9}{2}\right) - 4 = \frac{65}{4}$$

x	$-\infty$	$\frac{9}{2}$	$+\infty$
f(x)	↗	$\frac{65}{4}$	↘

13) $r(x) = 10x^2 - 2x + 5$

$$\alpha = -\frac{b}{2a} = -\frac{(-2)}{2 \times 10} = \frac{1}{10}$$

$$\beta = f(\alpha) = 10 \times \left(\frac{1}{10}\right)^2 - 2 \times \left(\frac{1}{10}\right) + 5 = \frac{49}{10}$$

x	$-\infty$	$\frac{1}{10}$	$+\infty$
f(x)	↘	$\frac{49}{10}$	↗

14) $s(x) = -6x^2 + 7x - 3$

$$\alpha = -\frac{b}{2a} = -\frac{7}{2 \times (-6)} = \frac{7}{12}$$

$$\beta = f(\alpha) = -6 \times \left(\frac{7}{12}\right)^2 + 7 \times \left(\frac{7}{12}\right) - 3 = -\frac{23}{24}$$

x	$-\infty$	$\frac{7}{12}$	$+\infty$
f(x)	↗	$-\frac{23}{24}$	↘

15) $t(x) = x^2 - 10x + 8$

$$\alpha = -\frac{b}{2a} = -\frac{(-10)}{2 \times 1} = 5$$

$$\beta = f(\alpha) = 5^2 - 10 \times 5 - 2 = -17$$

x	$-\infty$	5	$+\infty$
f(x)	↘	-17	↗

16) $u(x) = 4x^2 + 6x + 2$

$$\alpha = -\frac{b}{2a} = -\frac{6}{2 \times 4} = -\frac{3}{4}$$

$$\beta = f(\alpha) = 4 \times \left(-\frac{3}{4}\right)^2 + 6 \times \left(-\frac{3}{4}\right) + 2 = -\frac{1}{4}$$

x	$-\infty$	$-\frac{3}{4}$	$+\infty$
f(x)	↘	$-\frac{1}{4}$	↗

17) $v(x) = -3x^2 + 5x + 9$

$$\alpha = -\frac{b}{2a} = -\frac{5}{2 \times (-3)} = \frac{5}{6}$$

$$\beta = f(\alpha) = -3 \times \left(\frac{5}{6}\right)^2 + 5 \times \left(\frac{5}{6}\right) + 9 = \frac{133}{12}$$

x	$-\infty$	$\frac{5}{6}$	$+\infty$
f(x)	↗	$\frac{133}{12}$	↘

18) $w(x) = 7x^2 - 1x + 10$

$$\alpha = -\frac{b}{2a} = -\frac{(-1)}{2 \times 7} = \frac{1}{14}$$

$$\beta = f(\alpha) = 7 \times \left(\frac{1}{14}\right)^2 - \left(\frac{1}{14}\right) + 10 = \frac{279}{28}$$

x	$-\infty$	$\frac{1}{14}$	$+\infty$
f(x)	↘	$\frac{279}{28}$	↗

19) $x(x) = 2x^2 + 3x - 6$

$$\alpha = -\frac{b}{2a} = -\frac{3}{2 \times 2} = -\frac{3}{4}$$

$$\beta = f(\alpha) = 2 \times \left(-\frac{3}{4}\right)^2 + 3 \times \left(-\frac{3}{4}\right) - 6 = -\frac{57}{8}$$

x	$-\infty$	$-\frac{3}{4}$	$+\infty$
f(x)	↘	$-\frac{57}{8}$	↗

20) $y(x) = -9x^2 + 4x + 7$

$$\alpha = -\frac{b}{2a} = -\frac{4}{2 \times (-9)} = \frac{2}{9}$$

$$\beta = f(\alpha) = -9 \times \left(\frac{2}{9}\right)^2 + 4 \times \left(\frac{2}{9}\right) + 7 = -\frac{2}{9}$$

x	$-\infty$	$\frac{2}{9}$	$+\infty$
f(x)	↗	$\frac{67}{9}$	↘