ALGEBRE : 4UAA5 Inéquations

Exercices récapitulatifs

Notions à maîtriser : **factorisation**
méthode delta (formules, différents cas …)
tableaux de signes

Première série

Enonces

1) $\frac{4x-1}{5}-(2x+1)^2<1-4x^2$

2) $-5x(2x+83)\leq 0$

3) $6x^2+11x<35$

4) $\frac{25x^2+30x+9}{(9+x)(x^3-1)}\geq 0$

5) $-6x^6(-x^2-16)<0$

6) $\frac{2x^3}{-x^2-5x-6}\geq 0$

7) $\frac{(7-2x)^3}{(1-x^2)^4}<0$

8) $\frac{3-4x}{1-x}>2$

9) $\frac{5-x}{2x+1}<\frac{x+3}{3-2x}$

10) $16x^2>25$

Solutions

1)
$$\frac{-16x-11}{5}<0$$
$$-16x-11<0$$
$$x>-11/16$$
S =]-11/16,+ ∞ [

2) -5x = 0
x = 0

	-83/2		0	
+	+	+	0	-
-	0	+	+	+
-	0	+	0	-

S =]- ∞,-83/2] U [0,+ ∞ [

3) 6x² + 11x – 35 < 0

	-7/2		5/3	
+	0	-	0	+

S =]-7/2,5/3[

4) $$\frac{(5x+3)^2}{(9+x)(x-1)(x^2+x+1)}\geq 0$$

	-9		-3/5		1	
+	+	+	0	+	+	+
-	0	+	+	+	+	+
-	-	-	-	-	0	+
+	+	+	+	+	+	+
+	/	-	0	-	/	+

S =]- ∞,-9[U {-3/5} U]1,+ ∞ [

5) -x² - 16 = 0 x² = -16 (pas de racine)

	0	
-	-	-
+	0	+
-	-	-
+	0	+

S = { }

6) 2x³ peut être décomposé en 2 et x³

	-3		-2		0	
-	-	-	-	-	0	+
-	0	+	0	-	-	-
+	/	-	/	+	0	-

S =]- ∞, -3[U]-2,0]

7)

	-1		1		7/2	
+	+	+	+	+	0	-
+	0	+	0	+	+	+
+	/	+	/	+	0	-

S =]7/2, + ∞ [

8) $\frac{1-2x}{1-x} > 0$

	½		1	
+	0	-	-	-
+	+	+	0	-
+	0	-	/	+

S =]- ∞,1/2[U]1, +∞ [

9) $\frac{(5-x)(3-2x)-(x+3)(2x+1)}{(2x+1)(3-2x)} < 0$

$\frac{-20x+12}{(2x+1)(3-2x)} < 0$

	-1/2		3/5		3/2	
+	+	+	0	-	-	-
-	0	+	+	+	+	+
+	+	+	+	+	0	-
-	/	+	0	-	/	+

S =]- ∞,-1/2[U]3/5,3/2[

10) $16x^2 - 25 > 0$

	-5/4		5/4	
+	0	-	0	+

S =]- ∞,-5/4[U]5/4,+ ∞ [

Deuxième série

1. $x^2 + 9 < 0$
2. $16x^2 - 25 > 0$
3. $6x^3 \leq 2x^2$
4. $2x^2 (3x^2 - 1) \leq 0$
5. $(x - 1)^2 \geq 0$
6. $5x^4 \leq 0$
7. $-2x^2 \geq 4$
8. $\dfrac{4x-1}{3} - (x+1)^2 < 2 - x^2$
9. $5x(2x - 81) \leq 0$
10. $\dfrac{6x-5}{9-x} \geq 0$
11. $18x^2 + 9x < 14$
12. $\dfrac{9x^2+12x+4}{(9-x)(2x^3-17x^2-15x+54)} \geq 0$
13. $-6x^7 (x^2 - 16) < 0$
14. $\dfrac{2x^4}{x^2-5x+6} \geq 0$
15. $\dfrac{4x-3}{x-1} > 2$
16. $\dfrac{4-x}{2x-1} < \dfrac{x+3}{3-2x}$
17. $16x^2 < 4$
18. $\dfrac{-\sin 2\pi/3}{-x^4+2x^3-2x^2+x} > \cos\dfrac{\pi}{2}$
19. $\dfrac{(7-2x)^3}{(1-5x)^4} < 0$
20. $\dfrac{\cos\dfrac{7\pi}{4} - 0{,}8}{x^3-6x^2+12x-8} > 0$

Solutions

1. S = { }
2. $S =]-\infty, \frac{-5}{4}[\cup]\frac{5}{4}, +\infty[$
3. $S =]-\infty, \frac{1}{3}]$
4. $S = [-\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}]$
5. S = R
6. S = {0}
7. S = { }
8. $S =]-5, +\infty[$
9. $S = [0, \frac{81}{2}]$
10. $S = [\frac{5}{6}, 9[$
11. $S =]\frac{-7}{6}, \frac{2}{3}[$
12. $S =]-2, \frac{3}{2}[$
13. $S =]-4, 0[\cup]4, +\infty[$
14. $S =]-\infty, 2[\cup]3, +\infty[$
15. $S =]-\infty, \frac{1}{2}[\cup]1, +\infty[$
16. $S =]-\infty, \frac{1}{2}[\cup]\frac{15}{16}, \frac{3}{2}[$
17. $S =]-\frac{1}{2}, \frac{1}{2}[$
18. rem : $\sin\frac{2\pi}{3} = \sin\frac{\pi}{3} = \frac{\sqrt{3}}{2} \quad et \quad \cos\frac{\pi}{2} = 0$
    $S =]-\infty, 0[\cup]1, +\infty[$
19. $S =]\frac{7}{2}, +\infty[$
20. rem : $\cos\frac{7\pi}{4} = \cos\frac{\pi}{4} = \frac{\sqrt{2}}{2}$
    $S =]-\infty, 2[$