1- Risolvi le seguenti disequazioni, esprimendo le soluzioni nei due modi che conosci:

$$\frac{1}{2}(4x-2) \le 6x+7 \qquad x\left(\frac{1}{3}x-1\right) > \frac{1}{3}x^2-2 \qquad 3(x-2) \ge 2\left(3x-\frac{1}{2}\right)$$

1- 1) $\frac{1}{2}(4x-2) \le 6x+7$

$2x-1 \le 6x+7$

$2x-6x \le 1+7$

$\frac{-4x}{-4} \le \frac{8}{-4}$

$x \ge -2$ $\qquad [-2; +\infty[$

2) $x\left(\frac{1}{3}x-1\right) > \frac{1}{3}x^2-2$

$\cancel{\frac{1}{3}x^2}-x > \cancel{\frac{1}{3}x^2}-2$

$-x > -2$

$x < 2$ $\qquad]-\infty; 2[$

3) $3(x-2) \ge 2\left(3x-\frac{1}{2}\right)$

$3x-6 \ge 6x-1$

$3x-6x \ge 6-1$

$\frac{-3x}{-3} \ge \frac{5}{-3}$

$x \le -\frac{5}{3}$ $\qquad]-\infty; -\frac{5}{3}]$

2- Risolvi le seguenti disequazioni, esprimendo le soluzioni nei due modi che conosci:

$$4x^2+x \ge 0 \qquad 2x^2-\frac{1}{2} < 0 \qquad 3-12x^2 \le 0 \qquad -x^2+3x-2 > 0$$

$$4x^2+3 > 0 \qquad 6x < 9x^2+1 \qquad x^2-x+1 \le 0$$

2- 1) $4x^2+x \ge 0$

$x(4x+1) \ge 0$

		$-\frac{1}{4}$		0	
x	$-$		$-$	0	$+$
$4x+1$	$-$	0	$+$		$+$
$x(4x+1)$	$+$	$\bullet$	$-$	$\bullet$	$+$

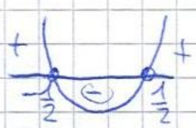
$x \le -\frac{1}{4} \vee x \ge 0$ $\qquad]-\infty; -\frac{1}{4}] \cup [0; +\infty[$

2) $2\left(2x^2-\frac{1}{2}\right) < 0 \cdot 2$

$4x^2-1 < 0$

$(2x+1)(2x-1) < 0$

		$-\frac{1}{2}$		$\frac{1}{2}$	
$2x+1$	$-$	0	$+$		$+$
$2x-1$	$-$		$-$	0	$+$
$(2x+1)(2x-1)$	$+$	0	$-$	0	$+$



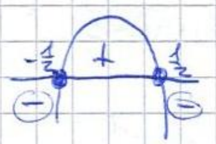
$-\frac{1}{2} < x < \frac{1}{2}$ $\qquad]-\frac{1}{2}; \frac{1}{2}[$

3) $3-12x^2 \le 0$

$3(1-4x^2) \le 0$

$3(1-2x)(1+2x) \le 0$

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



$x \le -\frac{1}{2} \vee x \ge \frac{1}{2}$ $\quad$ $]-\infty; -\frac{1}{2}] \cup [\frac{1}{2}; +\infty[$

$-x^2+3x-2>0$

$\Delta = 9-4(-1)(-2) = 9-8 = 1$

$x_{1,2} = \frac{-3 \pm \sqrt{1}}{-2} = \frac{-3 \pm 1}{-2}$ $\left< \begin{array}{l} \frac{-4}{-2} = 2 \\ \frac{-2}{-2} = 1 \end{array} \right.$

$-1(x-2)(x-1)$

	1		2	
-1	$-$	$-$		$-$
$x-2$	$-$	$-$	0	$+$
$x-1$	$-$ 0	$+$		$+$
$-1(x-2)(x-1)$	$-$	$+$		$-$

$1<x<2$ $\quad$ $]1;2[$

5) $4x^2+3>0$

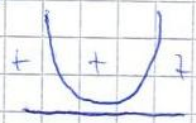
equazione associata

$4x^2+3=0$

$4x^2=-3$

$x^2=-\frac{3}{4}$

$x_{1,2} \notin \mathbb{R}$



$\forall x \in \mathbb{R}$ $\quad$ $]-\infty; +\infty[$

4 $\quad 6x < 9x^2+1$

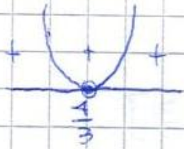
$6x-9x^2-1<0$

$-9x^2+6x-1<0$

$9x^2-6x+1>0$

$(3x-1)^2>0$

		$\frac{1}{3}$	
$3x-1$	$-$	0	$+$
$3x-1$	$-$	0	$+$
$(3x-1)(3x-1)$	$+$	0	$+$



$x<\frac{1}{3} \vee x>\frac{1}{3}$ $\quad$ $]-\infty; \frac{1}{3}[\cup]\frac{1}{3}; +\infty[$

7) $x^2-x+1 \le 0$ $\qquad \Delta<0 \quad a>0$

$\Delta = 1-4 = -3$

$S = \emptyset$ $\qquad \nexists x \in \mathbb{R}$

3) Un’urna contiene 3 palline rosse, 2 verdi e 5 nere.
Si estraggono successivamente tre palline, senza rimetterle nell'urna.
Calcola la probabilità di ottenere:

a) tre palline rosse
a) una pallina nera e due verdi
b) la prima pallina verde e le altre due nere
c) tre palline di colore diverso
d) tre palline dello stesso colore

3- 3 palline rosse (R) 3 estrazioni successive senza reimissione
2 palline verdi (V)
5 palline nere (N) TOT: 10

a) $p(RRR) = \frac{3}{10} \cdot \frac{2}{9} \cdot \frac{1}{8} = \frac{1}{120}$

b) $p(NVV) + p(VVN) + p(VNV) = \frac{5}{10} \cdot \frac{2}{9} \cdot \frac{1}{8} + \frac{2}{10} \cdot \frac{1}{9} \cdot \frac{5}{8} + \frac{2}{10} \cdot \frac{5}{9} \cdot \frac{1}{8} = \frac{1}{72} + \frac{1}{72} + \frac{1}{72} = \frac{3}{72} = \frac{1}{24}$

c) $p(VNN) = \frac{2}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} = \frac{1}{18}$

d) $p(RVN) + p(RNV) + p(NRV) + p(NVR) + p(VNR) + p(VRN) =$
$= \frac{3}{10} \cdot \frac{2}{9} \cdot \frac{5}{8} + \frac{3}{10} \cdot \frac{5}{9} \cdot \frac{2}{8} + \frac{5}{10} \cdot \frac{3}{9} \cdot \frac{2}{8} + \frac{5}{10} \cdot \frac{2}{9} \cdot \frac{3}{8} + \frac{2}{10} \cdot \frac{5}{9} \cdot \frac{3}{8} + \frac{2}{10} \cdot \frac{3}{9} \cdot \frac{5}{8} =$
$= \frac{1}{24} + \frac{1}{24} + \frac{1}{24} + \frac{1}{24} + \frac{1}{24} + \frac{1}{24} = \frac{6}{24} = \frac{1}{4}$

e) $p(RRR) + p(VVV) + p(NNN) = \frac{1}{120} + 0 + \frac{5}{10} \cdot \frac{4}{9} \cdot \frac{3}{8} = \frac{1}{120} + \frac{1}{12} = \frac{1+10}{120} = \frac{11}{120}$