ChingQuizz : 2 exercises available for Quizz assessment :

1. *Introduction to inequalities*

E.844 Say whether the number 2 is a solution of the following inequalities :

(a) $3x > 5$ (b) $-2x > -3$

(b) $3x + 7 \leqslant 5x + 1$ (c) $2(x + 1) > 7$

E.9867 Say whether the number 2 is a solution of the following inequations :

(a) $3x + 1 > 5$ (b) $-2x + 6 \geqslant 2$

(c) $8(1 - x) < -5(x + 1)$ (d) $(3x - 8)^2 > -3$

E.2092

Which of the following inequalities hold true for $x = 2$:

(a) $3x + 2 > 5$ (b) $5 - 2x < -1$

(c) $2x + 1 > x + 5$ (d) $(x + 1)(x - 3) < 0$

E.9868 Which of the following inequalities hold for $x = 2$:

(a) $x^2 - 3x + 4 < 0$ (b) $\dfrac{x + 1}{x - 5} > 0$

E.2089 The following comparison is considered : $\dfrac{3x - 2}{4} \leqslant \dfrac{2 - x}{2}$

Check whether the following numbers verify this inequality :

(a) $x = -2$ (b) $x = 1$ (c) $x = 3$

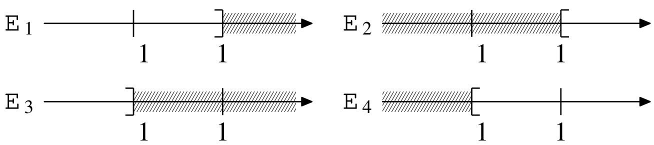
2. *Representation of an inequality*

E.4124 Consider the six inequalities below :

(a) $x > -1$ (b) $x < 1$ (c) $x > 1$

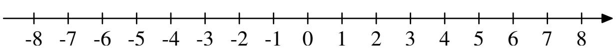
(d) $-x > 1$ (e) $-x < -1$ (f) $-x > -1$

Associate each of these inequations, associate the set of its solutions has one of the representations below :

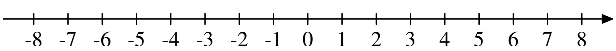


E.6433

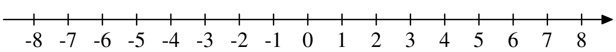
(1) Hatch on the graduated line, the set of numbers x verifying the inequality $x + 3 > 2$:



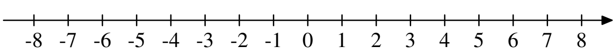
(2) Hash on the graduated line, the part of the numbers x verifying the comparison $x - 1 < 4$:



(3) Hash on the graduated line, the part of the numbers x verifying the comparison $2 \times x > 4$:

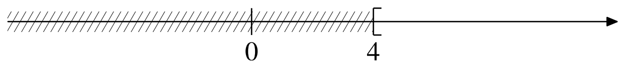


(4) Hash on the graduated line, the part of the numbers x verifying the comparison $-x > 1$:

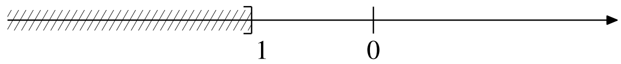


E.5553 Justify that each of the statements below is false :

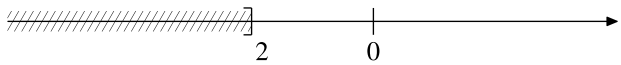
(a) The inequation $3x < 10$ admits for solution the set of solutions represented on the scaled line below :



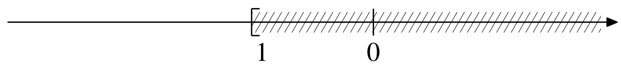
(b) The inequation $-2x > 5$ admits for solution the set of solutions represented on the graduated line below :



(c) The inequation $x + 3 < 4$ admits for solution the set of solutions represented on the graduated line below :



(d) The inequation $-x + 5 < 8$ admits for solution the set of solutions represented on the graduated line below :



E.4123 Consider the eight inequalities below :

(a) $x + 2 > 4$ (b) $x + 6 < 4$ (c) $2x > -4$ (d) $3x < -6$

(e) $2x + 1 > 5$ (f) $-x < 2$ (g) $-2x < -4$ (h) $-0.5x + 1 > 0$

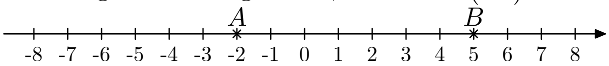
Each of these inequations has one and only one of the following sets of numbers as its solution set :

- E_1 : "*all numbers strictly greater than* 2".
- E_2 : "*all numbers strictly less than* 2".
- E_3 : "*all numbers strictly greater than* -2".
- E_4 : "*all numbers strictly less than* -2".

3. *Inequality and operations*

E.11005

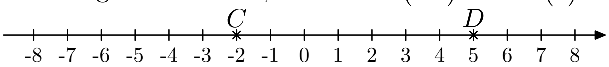
① On the graduated right side, we have $A(-2)$ and $B(5)$:



ⓐ Compare the x-coordinates of these points : $x_A \dots x_B$

ⓑ Place the two points A' and B' defined by :
$A'\big(x_A+2\big)$; $B'\big(x_B+2\big)$
Compare the x-coordinates of these two points.

② On the graduated line, we have $C(-2)$ and $D(5)$:

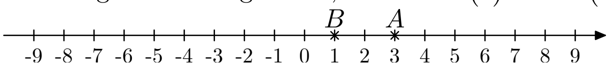


ⓐ Compare the x-coordinates of these points : $x_C \dots x_D$

ⓑ Place the two points C' and D' defined by :
$C'\big(x_C-3\big)$; $D'\big(x_D-3\big)$
Compare the x-coordinates of these two points.

E.11014

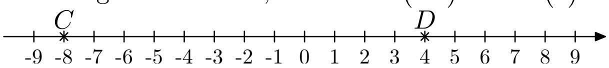
① On the graduated right side, we have $A(1)$ and $B(3)$:



ⓐ Compare the x-coordinates of these points : $x_A \dots x_B$

ⓑ Place the two points A' and B' defined by :
$A'\big(2x_A\big)$; $B'\big(2x_B\big)$
Compare the x-coordinates of these two points.

② On the graduated line, we have $C(-8)$ and $D(4)$:

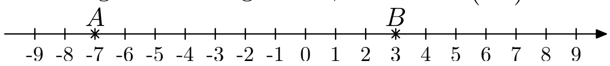


ⓐ Compare the x-coordinates of these points : $x_C \dots x_D$

ⓑ Place the two points C' and D' defined by :
$C'\left(\dfrac{x_C}{4}\right)$; $D'\left(\dfrac{x_D}{4}\right)$
Compare the x-coordinates of these two points.

E.11348

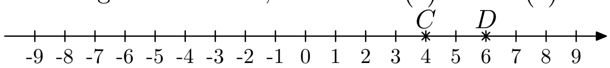
① On the graduated right side, we have $A(-7)$ and $B(3)$:



ⓐ Compare the x-coordinates of these points : $x_A \dots x_B$

ⓑ Place the two points A' and B' defined by :
$A'\big(-x_A\big)$; $B'\big(-x_B\big)$
Compare the x-coordinates of these two points.

② On the graduated line, we have $C(4)$ and $D(6)$:



ⓐ Compare the x-coordinates of these points : $x_C \dots x_D$

ⓑ Place the two points C' and D' defined by :
$C'\left(\dfrac{x_C}{-2}\right)$; $D'\left(\dfrac{x_D}{-2}\right)$
Compare the x-coordinates of these two points.

E.5665 Consider a number x indeterminate :

ⓐ Si $2x>4$ then $x\dots$ ⓑ Si $-x>4$ then $x\dots$

ⓒ Si $5x>5$ then $x\dots$ ⓓ Si $-2x>6$ then $x\dots$

4. *First approaches*

E.8063 Solve the following inequalities and represent their solution set on a number line :

ⓐ $x+1>0$ ⓑ $2x+4\geqslant 3$ ⓒ $-x+3\leqslant 5$

> **Hint :** Represent the set of solutions on a number line and in interval form.

E.431 Solve the following inequalities and express their solution sets as intervals :

ⓐ $3x+1>x+2$ ⓑ $2x+4\geqslant 4x-1$ ⓒ $5x+3\leqslant 4x$

> **Hint :** The solution sets will be represented on a number line and as intervals.

E.9219 Solve the following inequalities :

ⓐ $2x-1\leqslant 5x+4$ ⓑ $3x+2<x+2$

> **Hint :** The set of solutions will be represented on a graduated line and in interval form.

E.2455

Solve the following inequalities and represent the set of solutions on a number line in each case :

ⓐ $6x-3>2x-9$ ⓑ $x+2\leqslant 2x+1$

> **Hint :** Represent the set of solutions on a number line and in interval form.

E.9869 Solve the following inequalities and represent the set of solutions on a number line in each case :

ⓐ $7x+3>4x+1$ ⓑ $2x+1\geqslant 8x+5$

> **Hint :** Represent the set of solutions on a number line and in interval form.

E.11349 Solve the following inequalities and represent the set of solutions on a number line in each case :

ⓐ $5x+1<3x+9$ ⓑ $3x+2<5x+5$

> **Hint :** Represent the set of solutions on a number line and in interval form.

E.11350 Solve the following inequalities:

a) $2x+4<5x-7$ b) $3x+1<x-5$

Hint: The set of solutions will be represented on a graduated line and in interval form.

E.11410 Solve the following inequalities:

a) $3x+3<6x+8$ b) $-3x+2\geqslant -8x-7$

Hint: The set of solutions will be represented on a graduated line and in interval form.

E.11467 Solve the following inequalities:

a) $4x+1<11x+10$ b) $-4x+3\geqslant -12x-6$

Hint: Give the set of solutions in the form of an interval.

E.8032 Solve the inequalities below and give the set of solutions as an interval:

a) $x+1>0$ b) $2x\geqslant 4$

c) $x+2\leqslant 5$ d) $3x+2<-1$

5. *Parts of R and literal expressions*

E.6432

1) Shade the part of the numbers on the right-hand scale that satisfy the comparison $x>2$:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

Give the notation for this set in the form of an interval.

2) Shade the part of the numbers on the number line that satisfy the comparison $x<4$:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

Give the notation for this set in the form of an interval.

E.5666 Consider a number x undetermined but known to be strictly greater than 2: $x>2$

1) Hash the part of the graduated line below where the number x is located:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

2) Hash the part of the graded line below where the number $2x$ is located:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

3) Hash the part of the graded line below where the number $x-3$ is located:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

4) Hash the part of the graded line below où the number $-\frac{1}{2}x$:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

E.9226 Consider a number x that is undetermined but is known to verify the following frame: $2<x<4$

1) Hash the part of the graduated line below where the number x is located:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

2) Hash the part of the graded line below where the number $2x$ is located:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

3) Hash the part of the scaled line below where the number $x-3$ is located:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

4) Hash the part of the graded line below où the number $-\frac{1}{2}x$:

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

6. *Simple equations*

E.845 Represent on a graduated line the solutions of the following equations:

a) $x>5$ b) $x\leqslant -1$ c) $2x>2$

d) $3x+1<-2$ e) $-x>5$ f) $-x+1>3$

E.847 ⚠ french Polynesia - September 2005 Consider the inequation: $2x-5\leqslant 3-11x$.

1) a) Is the number 0 a solution to this inequation? Justify the answer.

b) Is the number 1 a solution to this inequation? Justify the answer.

2) a) Solve the inequation: $2x-5\leqslant 3-11x$

b) Represent the solutions on a graduated line.

E.344 Which of the following inequations accept the number 9 as a solution:

(a) $-3x+2 \geqslant 0$ (b) $5(x+9)>0$

(c) $\frac{x+1}{4} \geqslant -3\times\frac{x-2}{3}$ (d) $2>x$

E.478 Solve the following inequalities and give their solution sets in interval form:

(a) $2x+1 \geqslant 3x-1$ (b) $-x-\frac{1}{2} \leqslant x+2$

E.9792 Solve the following inequalities and give the set of solutions in the form of intervals:

(a) $-3x+7 \leqslant x+2$ (b) $-6x+1>0$

(c) $-\frac{x}{4}<5$ (d) $-3(x+5)<x+5$

(e) $-3x+7 \leqslant 9-x$

7. *Inequations and algebraic operations*

E.9224 Solve the following inequalities and plot the solutions on a graduated line:

(a) $2\times(5x-1)+2 \leqslant 3x+2$ (b) $3(2x+7) \geqslant x+1$

E.848 Solve the following inequalities and plot the results on a graduated line:

(a) $3x-(2x+4) \leqslant 3+2(x+1)$

(b) $3(-x+1)-4(2x-4) \geqslant 5$

E.853 Solve the following inequalities and plot the solutions on a graduated line:

(a) $3(2x+1)>3-3\times(x-5)$

E.857 Solve the following inequalities and graph the solutions:

(a) $2(x+3)-3(x+1)<2(3x+1)$

(b) $2\times(x+8) \leqslant 3-3\times(8-2x)$

E.850 Solve the following inequalities:

(a) $3x+2(5-x) \leqslant -2x+1$ (b) $214(3x-5)>214(2x+1)$

E.11411 Solve the inequality:

$3(2x+1)-5(4x-2) \geqslant 2x+1$

Hint: The set of solutions will be represented on a number line and in interval form.

E.11468 Solve the inequality:

$4(5x+2)-2(5-x)>4x+5$

Hint: Give the set of solutions in the form of an interval.

E.9223 Solve the inequality below and plot the solutions on a number line:

$(x-2)(2x-4) \geqslant 2x^2-8x+1$

E.846 Solve the following inequalities and represent their solution sets using a graduated line.

(a) $(x+1)^2+4 \geqslant x^2+1$ (b) $(3x-2)^2>9x^2+5$

E.2512 Solve the following inequalities and plot the solutions on a graduated line:

(a) $(2x-3)^2>(4x+1)(x+5)$

8. *Inequalities and rational numbers*

E.856 ⚠ Consider the expression: $D=\frac{4x+2}{5}$.

(1) Calculate D for $x=\frac{3}{4}$. Is the number $\frac{3}{4}$ a solution of the inequation $\frac{4x+2}{5}<3$?

(2) Solve the inequation $\frac{4x+2}{5}<3$ and plot the solutions on a graduated line?

E.852 We wish to solve the inequation: $\frac{2x+1}{4}+1>2x+\frac{x}{2}$

(1) Simplify the two expressions:
$4\times\left(\frac{2x+1}{4}+1\right)$; $4\times\left(2x+\frac{x}{2}\right)$

(2) To solve this inequation, multiply each member of the inequation by 4.

E.9225 Solve the inequation: $\frac{3x+1}{6}>\frac{5x-3}{8}$

E.9220 Solve the following inequalities and plot the results on a graduated line:

(a) $\frac{2x+1}{4}+1>2x+\frac{x}{2}$ (b) $\frac{x+1}{4}+\frac{1}{3} \geqslant \frac{x}{6}$

E.9221 Solve the following inequations and plot the results on a graduated line:

(a) $\dfrac{2x+1}{4}+1\geqslant 2x+\dfrac{x}{2}$ (b) $\dfrac{x+1}{3}+\dfrac{2-x}{15}>\dfrac{2x+7}{5}$

E.9222 Solve the following inequalities and plot the solutions on a graduated line:

(a) $\dfrac{3x+2}{4}+\dfrac{2-x}{3}<\dfrac{x+1}{12}$ (b) $\dfrac{5x+1}{2}+\dfrac{5}{9}\geqslant\dfrac{7x}{6}-\dfrac{1}{18}$

E.9816 Solve the following inequalities and give the set of solutions in the form of intervals:

(a) $3x+3\geqslant 1$ (b) $\dfrac{3x-1}{4}\leqslant -1$

E.9793 Solve the following inequalities and give the set of solutions in the form of intervals:

(a) $\dfrac{x+1}{2}+x<0$ (b) $\dfrac{x-2}{-4}<x+1$

E.2859 Solve the inequation: $\dfrac{3x-2}{6}+\dfrac{1}{3}\leqslant\dfrac{1}{4}+\dfrac{5}{2}x$

E.9794 Solve the following inequalities and give the solutions in the form of intervals:

(a) $\dfrac{x-1}{6}+\dfrac{x+1}{3}<2$ (b) $x+\dfrac{x}{2}-\dfrac{x}{6}\leqslant\dfrac{x+1}{3}+\dfrac{2x-3}{6}$

E.9815 Solve the following inequalities and give the set of solutions in interval form:

(a) $\dfrac{1}{2}-\dfrac{1}{2}\cdot x\leqslant\dfrac{1}{3}\cdot x+\dfrac{1}{6}$ (b) $\dfrac{1}{5}\cdot x+\dfrac{1}{2}>x-\dfrac{1}{3}$

9. Problems

E.851

(1) (a) 60 is solution of inequation: $2.5x-75>76$.

(b) Solve the inequation and plot the solutions on an axis. Hatch the part of the axis that does not correspond to the solutions.

(2) During the summer months, an ice cream vendor noticed that he was spending 75 euros a week to make, on average, 150 ice creams. Knowing that an ice cream is sold 2.50 euros, how many ice creams must he sell, at least, in the week to have a profit higher than 76 euros? We'll explain the process.

E.855

(1) Solve the inequation: $x+15\geqslant\dfrac{2}{3}(x+27)$

(2) A research office employs 27 computer scientists and 15 mathematicians. It is planned to hire the same number x of computer scientists and mathematicians. How many specialists of each kind must be hired so that the number of mathematicians is at least equal to two-thirds the number of computer scientists?

E.860 The company Alo proposes a telephone subscription of 98 F per month and 1.30 F per minute of communication.
Lao Company offers a phone subscription of 95 F per month and 1.45 F per minute of talk time. We denote x the number of call minutes per month.

(1) Express as a function of x the amount of an Alo bill, then the amount of a Lao bill.

(2) For which monthly call durations is it worth choosing Alo?

E.849 In 2005, a Paris metro ticket cost 1.40 €.
While the monthly subscription "Carte Orange" cost 50.40 € to circulate freely within downtown Paris.

After how many journeys does the Orange card become worthwhile? Justify your answer.

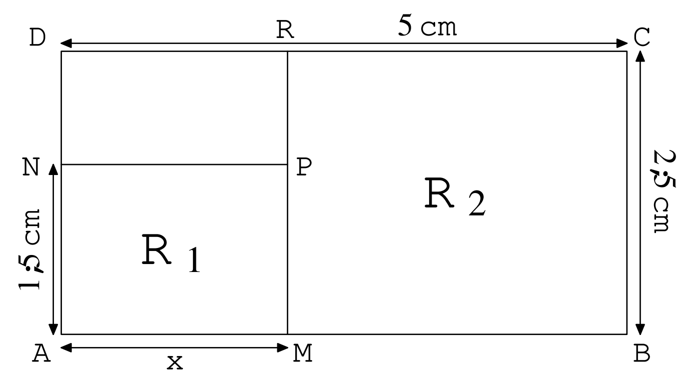
10. Problems and geometry

E.2506 $ABCD$ is a rectangle: $DC=5\,cm$; $BC=2.5\,cm$

N is the point on segment $[AD]$ such that: $AN=1.5\,cm$.
M is a point on segment $[AB]$.

Note x the length of segment $[AM]$ expressed in centimeters *(x is between 0 and 5)*.

$AMPN$ and $MBCR$ are rectangles noted R_1 and R_2 respectively.



(1) (a) Express, as a function of x, the perimeter of $\mathscr{R}_1$.

(b) Express, as a function of x, the perimeter of $\mathscr{R}_2$.

(2) What are the values of AM for which the perimeter of R_2 is greater than or equal to the perimeter of R_1?

11. *Inequations and factoring*

E.473 Solve the following inequalities :

(a) $(x+1)(1-x) > (2x-1)(x+1)$ (b) $x^3 - x \leqslant 0$

(c) $(x+1)^2 - (x+1)(2-x) \geqslant 0$

E.6688 Solve the inequation :
$(2x-1)(3-x) \geqslant (2x-1)(5x+1)$

E.9791 Consider the inequation : $(3x-1)(4x+5) > 3(3-2x)(2-6x)$

(1) Factor : $(3x-1)(4x+5) - 3(3-2x)(2-6x)$.

(2) Solve the inequation (E).

E.6686 Solve the following inequalities :

(a) $(2x-1)(3x+1) \leqslant (4-x)(3x+1)$

(b) $(3x+2)(2-3x) \geqslant (3x+2)(5x-2)$

E.9807 Solve the inequation :
$(3-x)(2x+3) < (x-3)(2x+6)$

E.9821 Solve the following inequalities :

(a) $(x-2)(x+1) > (2x+1)(2x+2)$

(b) $(3x-4)(5-2x) \geqslant (4x-10)(2-3x)$

E.9823 Solve the inequation :
$(3x-2)(4-2x) > 2(3-2x)(x-2)$

12. *Remarkable inequalities and identities*

E.483 Solve the inequation : $16x^2 \geqslant 25(x+1)^2$

E.9789 Solve the inequation :
$\dfrac{x^2-1}{x+2} < 0$

E.8191 Solve the inequation :
$(2x-1)\left(x^2+6x+9\right) < 0$

E.9826 Solve the inequation : $(x+1)^2 \geqslant x^2 - 1$

E.482 Solve the following inequalities in $\mathbb{R}$:

(a) $\dfrac{9x^2+36x+36}{2x-3} < 0$ (b) $\dfrac{x^2-5}{3x^2+2\sqrt{3}x+1} \leqslant 0$

E.456

(1) Find the factorization :
$2x^2 + 2\sqrt{6}x + 3 = (\sqrt{2}x + \sqrt{3})^2$

(2) Solve the inequality : $\dfrac{2x^2+2\sqrt{6}x+3}{(4x-1)(3-x)} < 0$

E.9822 Solve the following inequalities :

(a) $(4x+4)(x+2) < -1$ (b) $x(4x-3) > (x-1)(3x+4)$

E.461 Solve the following inequalities and give the set of solutions in interval form.

(a) $x^2+x+1 \geqslant (x+1)(x-1)$ (b) $\left(x+2\right)^2 < x^2+5x-2$

13. *Inequation and rational fractions*

E.9817

(a) Study the sign on $\mathbb{R}$ of the expression : $\dfrac{x+1}{x-1} + 1$

(b) Solve the inequation : $\dfrac{x+1}{x-1} < -1$

E.447 Solve the following inequalities :

(a) $\dfrac{1}{1+x} < \dfrac{1}{1-x}$ (b) $\dfrac{1}{x} + \dfrac{1}{x+5} \geqslant 0$

E.475 Solve the inequation : $\dfrac{3x+1}{-2x+1} > 1$

E.2856

(1) Determine the expression for P to perform the following factorization : $2x^2+x-1 = (x+1)\times P$

(2) Draw up the sign table for : $\dfrac{2x^2+x-1}{x^2-4}$

(3) Solve the following inequation : $\dfrac{5x^2+x-13}{x^2-4} \leqslant 3$

E.4816 Solve the following inequalities :

(a) $\dfrac{1}{x} \geqslant \dfrac{1}{5}$ (b) $\dfrac{1}{x} > \dfrac{3}{4}$ (c) $\dfrac{1}{x} < -\dfrac{1}{3}$ (d) $\dfrac{1}{x} < 2$

E.457 Consider the following algebraic expression:

$$\frac{2x+7}{x+3}-\frac{4x+4}{2x+1}$$

1. Reduce the previous expression to the same denominator.
2. Draw up the sign table for this expression.
3. Solve the inequation: $\dfrac{2x+7}{x+3}\leqslant\dfrac{4x+4}{2x+1}$

E.2876 Solve the following inequalities:

a. $\dfrac{2x-4}{4x+1}\leqslant\dfrac{3x+5}{6x}$ b. $\dfrac{4(2x+1)}{4x-1}+\dfrac{2-4x}{2x+3}\geqslant 0$

E.4916 Solve the inequation: $\dfrac{6-2x}{2x+4}\leqslant\dfrac{x-3}{5-x}$

E.9825 Solve the inequation: $\dfrac{5x+1}{2x-1}+\dfrac{3x+3}{x+1}\geqslant 0$

E.9818

1. Establish equality: $\dfrac{3x-6}{2x+3}-\dfrac{4-7x}{2x-2}=\dfrac{5x(4x-1)}{(2x-2)(2x+3)}$
2. Solve the inequation: $\dfrac{3x-6}{2x+3}<\dfrac{4-7x}{2x-2}$

E.2860

1. Expand the following expression: $(x-1)(x+3)$
2. Solve the inequation: $\dfrac{5x+1}{1-2x}+\dfrac{3x+3}{x}>0$

E.9824 Solve the following inequations: $\dfrac{x^2-x}{2x+4}\geqslant 0$

14. *Algebraic manipulations*

E.300

1. Here are four inequalities solved by students. Each one contains one or more errors. Identify the error(s) made by each student:

Student 1: $5x+2\leqslant 7x-3$ $12x\leqslant -1$ $x\leqslant -\dfrac{1}{12}$ $\mathcal{S}=\left]-\infty\,;\dfrac{1}{2}\right]$	*Student 2:* $3x-8\leqslant 4x+2+\sqrt{2}$ $-x\leqslant 10+\sqrt{2}$ $x\leqslant -10-\sqrt{2}$ $\mathcal{S}=\left]-\infty\,;-10-\sqrt{2}\right[$
Student 3: $\dfrac{1}{x}<1$ $1<1\times x$ $1<x$ $\mathcal{S}=\left]1\,;+\infty\right[$	*Student 4:* $x^2\geqslant x$ $x\geqslant 1$ $\mathcal{S}=\left[1\,;+\infty\right[$

2. Correctly restate the solution to each of these inequalities.

E.299 Consider two positive numbers a and b such that $a\leqslant b$.
For $c\in\mathbb{R}$, we wish to compare the numbers $a{\cdot}c$ and $b{\cdot}c$.

1. a. Give the sign of $a-b$.
   b. Depending on the sign of c, determine the sign of $(a-b)\times c$.
2. For a, b, c three real numbers, complete the following statements using comparison signs:
   - Si $a\leqslant b$ et $c\geqslant 0$ Alors $a{\cdot}c$ ...... $b{\cdot}c$
   - Si $a\leqslant b$ et $c\leqslant 0$ $a{\cdot}c$ ...... $b{\cdot}c$

E.341 In this exercise, a and b denote positive real numbers

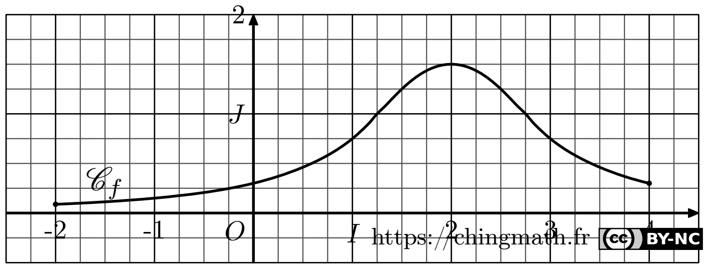
1. For $a\leqslant b$, prove the following two inequalities:
   $a^2\leqslant a\times b$; $b^2\geqslant a\times b$

   Complete the sentence: If $0\leqslant a\leqslant b$, then ...
2. Suppose that $a^2\leqslant b^2$:
   a. Factor the expression a^2-b^2
   b. Determine the sign of $a-b$. Compare a and b.
   c. Complete the following sentence:
   If a and b are positive, and $a^2\leqslant b^2$, then ...
3. If a and b are any two numbers such that $a^2\leqslant b^2$, can we deduce a comparison between the numbers a and b?

E.333 Let x and y be two real numbers with $x\neq 0$, show that $\dfrac{y}{x^2}$ and $\dfrac{y+3}{x^2+2}$ are arranged in the same direction as $2{\cdot}y$ and $3{\cdot}x^2$.

15. *Graphical solutions of inequalities*

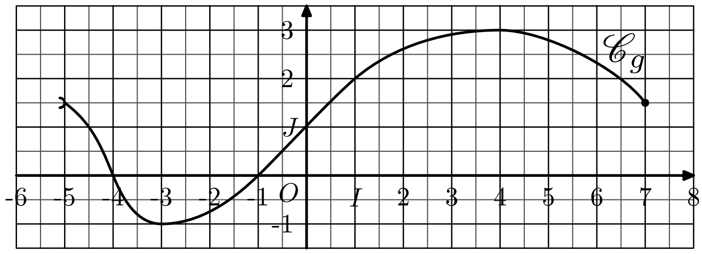
E.11488 Consider the function f defined on $\mathbb{R}$, whose curve $\mathscr{C}_f$ is given in the coordinate plane:



Graphically, give the set of solutions to the inequalities :

(a) $f(x) \geqslant 1$ (b) $f(x) \geqslant 0{,}75$

E.11607 In an orthonormal coordinate system $(O\,;I\,;J)$, consider the curve $\mathscr{C}_g$ representing the function g :



(1) Give, without justification, the domain of the function g.

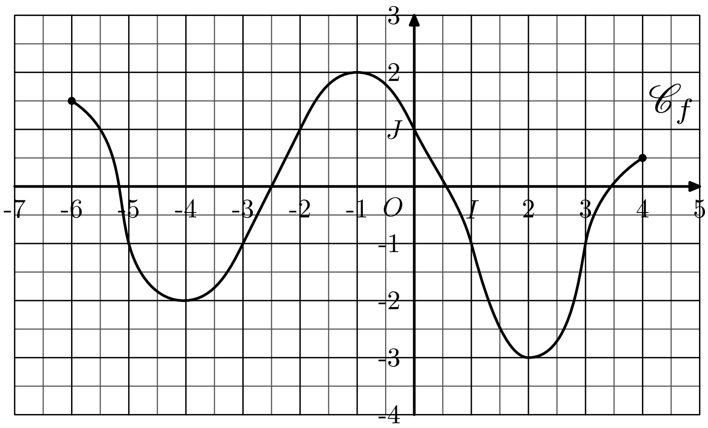
(2) Give, without justification, the solutions to the following two equations : (a) $g(x) = 2$ (b) $g(x) = 1$

(3) Solve the inequalities graphically :

(a) $g(x) \geqslant 2$ (b) $g(x) < 1$

Highlight the parts of the curve $\mathscr{C}_g$ used to answer these questions.

E.380 In a coordinate system $(O\,;I\,;J)$, consider the curve $\mathscr{C}_f$ representing the function f :



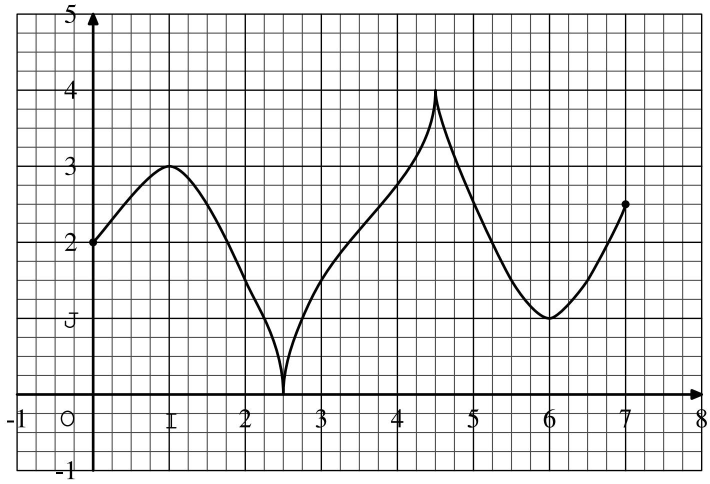
Answer the following questions graphically :

(1) Give the domain of this function.

(2) Graphically, solve the inequalities :

(a) $f(x) \geqslant 1$ (b) $f(x) \leqslant -1$

E.2752 In an orthonormal frame of reference $(O\,;I\,;J)$, consider the function f defined on the interval $[0\,;7]$ whose graphical representation is given below :

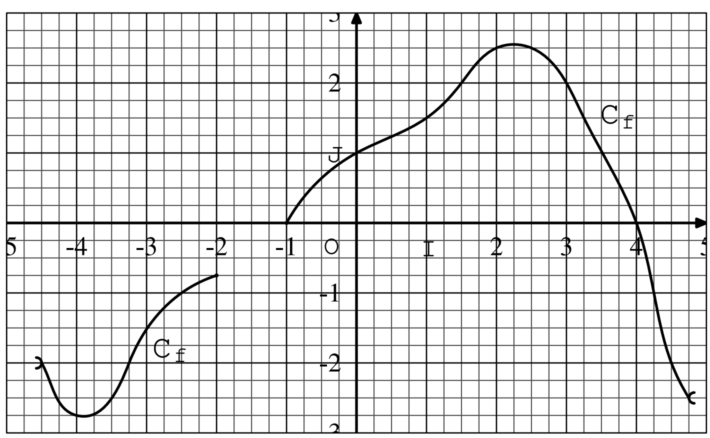


Graphically solve the following inequalities :

(a) $f(x) \geqslant 1.5$ (b) $f(x) \leqslant 1$

We'll leave a few construction lines.

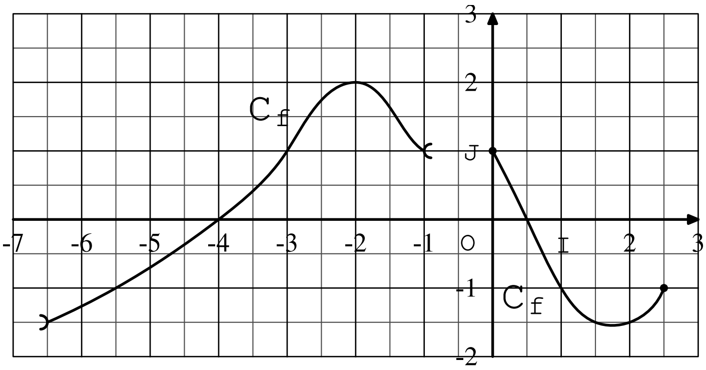
E.4384 In the reference frame $(O\,;I\,;J)$ below is represented the curve $\mathscr{C}_f$ representative of the function f



Graphically solve the following two inequalities :

(a) $f(x) \geqslant 1.5$ (b) $f(x) \leqslant -1$

E.2782 Consider the function f whose representation is given below in the frame $(O\,;I\,;J)$ orthonormal:

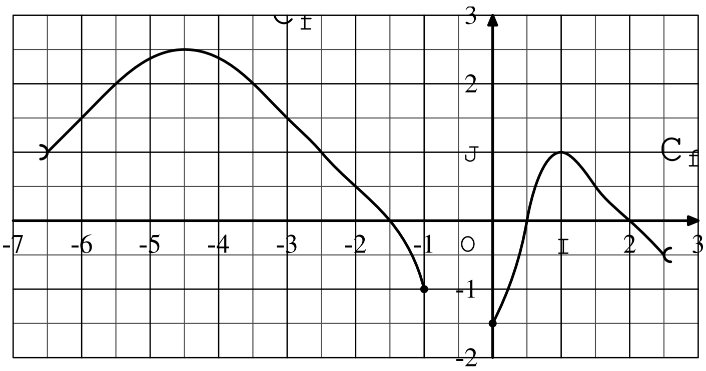


All questions will be answered using the graph below.

1. Give the definition set of the function f.
2. The construction features necessary to answer the following questions will be left:
   a. Determine the image of -5.5 by the function f.
   b. Determine the set of antecedents of 1 by the function f.
3. By highlighting the relevant parts of the curve $\mathscr{C}_f$, graphically solve the following two inequations:

   a. $f(x) \leqslant -1$ b. $f(x) \geqslant 0$

E.4914 Consider the function f whose representation is given below in the reference frame $(O\,;I\,;J)$ orthonormal:



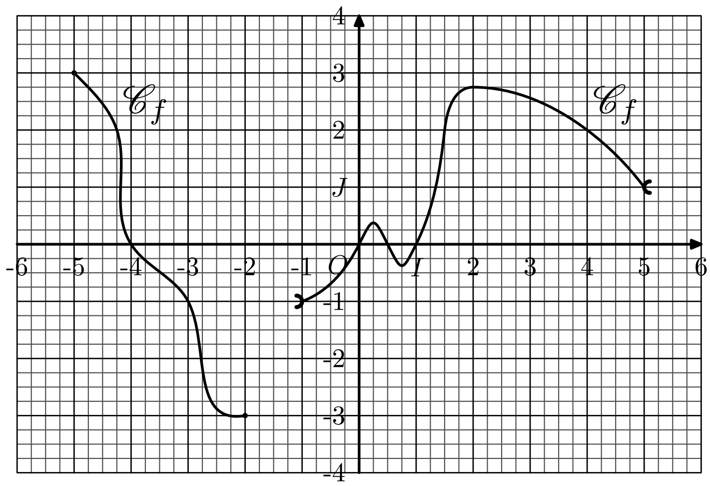
All questions will be answered using the graph below.

1. Give the definition set of the function f.
2. Answers to the following questions will be justified:
   a. Determine the image of the number 1 by the function f.
   b. Determine the set of antecedents of the number 1.5 by the function f.
3. Determine the image of the following intervals by the function f:

   a. $[-5.5\,;-2]$ b. $[0\,;2]$
4. Determine, for each question, the set of real x verifying the following inequalities:

   a. $f(x) \geqslant 0$ b. $1 < f(x) \leqslant 2$

E.532 The plane is given the reference frame $(O\,;I\,;J)$ orthonormal. Below is the curve $\mathscr{C}_f$ representative of the function f:



1. Give the definition set of the function f.
2. Determine, graphically, the image of the following numbers by the function f:

   a. -3 b. 1   c. 2
3. Determine, graphically, the set of antecedents of the number 2 by the function f.
4. a. Graphically solve the inequation: $f(x) \geqslant 2$.
   b. Graphically solve the inequation: $f(x) < 0$.

16. *Unclassified exercises*

E.858

1. a. Solve the following inequation:
   $7x - 2 > 3x + 6$
   b. On a graduated line, hatch the set of solutions to this inequation.
2. Solve the equation: $3(5x-7)(x-2) = 0$

E.2330 Consider the following numbers:

$A = 1001 \times 999 - 999^2$; $B = 57 \times 55 - 55^2$

$C = (-2) \times (-4) - (-4)^2$

1. a. Give the values read on the calculator for A, B and C.
   b. Are the integers A and B prime with each other? Justify briefly.
2. We pose: $D = (x+1)(x-1) - (x-1)^2$
   a. x being an integer, greater than 1, show that D is a

multiple of 2.

(b) For what values of x, is D a negative or zero number? Plot the values found on an axis, hatching the part that doesn't fit.

(3) Find an expression E of the same form as A for which the result of the calculation is 2008.

E.2511 In each row of the table, three statements are proposed. Only one is correct. For each line, copy the number of the correct proposition on the copy:

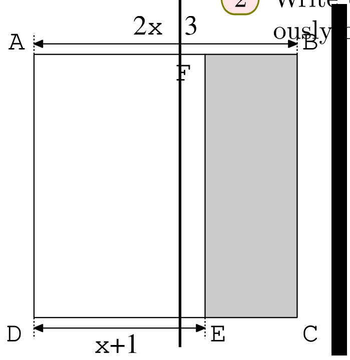
Proposal 1	Proposal 2	Proposal 3
$\frac{2}{5}+\frac{5}{12}-\frac{1}{15}=\frac{23}{30}$	$\frac{2}{5}+\frac{5}{12}-\frac{1}{15}=3$	$\frac{2}{5}+\frac{5}{12}-\frac{1}{15}=0.75$
$\frac{8}{25}\div\frac{16}{75}=\frac{2}{3}$	$\frac{8}{25}\div\frac{16}{75}=\frac{3}{2}$	$\frac{8}{25}\div\frac{16}{75}=\frac{1}{6}$
$\sqrt{16+9}=7$	$\sqrt{16+9}=5$	$\sqrt{16+9}=12$
$(2x-5)^2$ $=4x^2-14x+25$	$(2x-5)^2$ $=4x^2-20x+25$	$(2x-5)^2$ $=4x^2-25$
$49x^2-25$ $=(7x-5)^2$	$49x^2-25$ $=(7x-5)(7x+5)$	$49x^2-25$ $=(7x-5)(7x-5)$
(-2) is a solution of the equation: $(x-2)(2x+4)=0$	(-2) is a solution of the equation: $x^2+4=0$	(-2) is a solution of the equation: $-2x+4=0$
102 is a solution of the inequation $2x+1\leqslant 3$	102 is a solution of the inequation $-2x+1\leqslant 3$	102 is a solution of the inequation $-2x+1>3$

E.854

india, June 1999 (1) Solve the inequation: $2x-3\geqslant x+1$

(2) x denoting a number greater than or equal to 4, $ABCD$ is a square whose side measures $2x-3$.

(a) Show that the area of the rectangle $BCEF$ is expressed by the formula:
$A(x)=(2x-3)^2-(2x-3)(x+1)$



(b) Expand and reduce $A(x)$.

(c) Factorize $A(x)$.

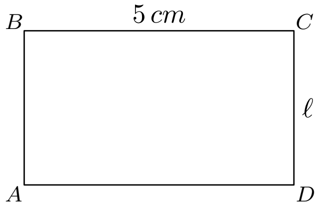
(d) Solve the equation: $(2x-3)(x-4)=0$

(e) For what value(s) of x is the area of $BCEF$ zero?

E.6430

Consider a rectangle $ABCD$ with a length of $5\,m$ and a width ℓ whose value is unknown, but whose boundaries are known as follows:

$2\leqslant\ell\leqslant 3$



(1) Give a range for the perimeter $\mathcal{P}$ of the rectangle $ABCD$.

(2) Give a range for the area $\mathcal{A}$ of the rectangle $ABCD$.

E.466 Solve the following inequalities:

(a) $(x+1)^2>0$ (b) $(x+1)^2\geqslant 0$

(c) $(x+1)^2<0$ (d) $x^2+1\leqslant 0$

(e) $x^2-4<(x+2)^2$ (f) $(x+1)^2-(x-1)^2\geqslant 0$

E.306 Let n be a relative integer $(n\in\mathbb{Z})$. Determine the set of solutions of equation:

$-3\cdot n^2+5>-13$

E.343

(1) For each question, plot the set of numbers verifying the frame on a graduated line:

(a) $-1\leqslant x\leqslant 2$ (b) $\sqrt{2}\leqslant x<\sqrt{3}$

(c) $x>9$ (d) $-5>x$

(2) Write down in interval form the sets represented previously on a graduated line.

