ChingQuizz : 12 exercises available for Quizz assessment :

1. *Reminders on simplification*

E.1081 Reduce, if possible, the following literal expressions :

(a) $12+5x$ (b) $4\times5x$

(c) $3x-(-3)\times x$ (d) $-7x+9x^2$

(e) $2x^2+7x^2$ (f) $9x^2+5x-4-2x+5x^2$

E.4521 Expand, then reduce the following expressions :

(a) $3\times(2x+1)-3x\times5$ (b) $2(x-1)+x(2-x)$

(c) $-5\times3x+3\times(5-x)$ (d) $x(2-x)+3(3+x)$

E.7929 Factor the following expressions :

(a) $3x+3$ (b) $6x+9$ (c) $3x^2+2x$ (d) x^2+x

2. *The opposite of a number*

E.1715

1 (a) What are the numbers -4 and 4 called, between them?

(b) What are the numbers 3 and $\frac{1}{3}$ called, between them?

Definition :

- Two numbers a and b are said to **opposés** if their sums are 0
- Two numbers a and b are said **inverses** if their product is 1.

Note :

- two numbers are opposite 'they have the same distance to zero but are of opposite signs.
- two rational numbers are inverse if their numerator and denominator are reversed between each other.

2 Complete, line by line, the table below :

a	b	$a+b$	$a-b$	$-a+b$	$-a-b$
2	3				
-4	5				
9	-2				

3 Using the previous table as a guide, complete the following sentences :

- For any number a and b, the opposite of $(a+b)$ is :

  $-(a+b)=\ldots\ldots\ldots\ldots$

- For any number a and b, the opposite of $(a-b)$ is :

  $-(a-b)=\ldots\ldots\ldots\ldots$

E.1074

Proposition : the opposite of a sum is equal to the sum of the opposites.

Examples : $-(5+4)=-5-4$ $-(7-3)=-7+3$

For each question, name the number "*intruder*" :

	(a)	(b)	(c)
1	$-(5+1)$	$-5+1$	$-5-1$
2	$7-3$	$-(7-3)$	$-7+3$
3	$-(-2.5+3)$	$2.5-3$	$2.5+3$
4	$-(x-2)$	$-x-2$	$-x+2$

E.1860 For each question, give the intruder value :

	(a)	(b)	(c)	(d)
1	$-(2\times3)$	$(-2)\times3$	$2\times(-3)$	$(-2)\times(-3)$
2	$-[(-4)\times5]$	$4\times(-5)$	$-4\times(-5)$	4×5
3	$-(2\times3\times4)$	$(-2)\times3\times4$	$2\times3\times(-4)$	$-2\times(-3)\times4$

Note : to take the opposite of a product, we change only one of the factors to its opposite

E.1918 Complete the following dotted lines to verify equality :

(a) $-(3+4)=\ldots3\ldots4$ (b) $-(-2+1)=\ldots2\ldots1$

(c) $-(-4-7)=\ldots4\ldots7$ (d) $-(7-9)=\ldots7\ldots9$

E.7923 Complete the following blanks to verify equality :

(a) $-(-4+12)=\ldots4\ldots12$ (b) $-(3+7)=\ldots3\ldots7$

E.1736 For each question, look for the odd one out :

	a	b	c
1	$-(2\times5+3)$	$-2\times5+3$	$-2\times5-3$
2	$-(3-5\times2)$	$-3+5\times2$	$-3-5\times2$
3	$-(2\times3+4\times5)$	$(-2)\times3+4\times5$	$-2\times3-4\times5$

E.1076 Which of the 4 expressions below is the odd one out?

a $-[3\times(2x-3)]$ b $(-3)\times(2x-3)$

c $3\times(-2x+3)$ d $(-3)\times(-2x+3)$

E.7920 Which of the 4 expressions below is the odd one out?

a $-[2\times(4x+1)]$ b $(-2)\times(4x+1)$

c $2\times(-4x-1)$ d $(-2)\times(-4x-1)$

3. *Removal of parentheses in a sum or difference*

E.1737 Give the reduced form of each of the following expressions :

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

c $2-(2x-1)$ d $3x-(-2x-1)$

E.1919 Give the contracted form of each of the following expressions :

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

E.1923 Give the reduced form of each of the following expressions :

a $3-(2x+1-x^2)$ b $(x+1)-(2-x)$

E.4475 Give the reduced form of each of the following expressions :

a $(3x+4)-(x^2-4x+2)$ b $-(x+3)+x^2-x+2$

c $-(x^2-2)+(3x^2+4x)$

E.8974 Give the reduced form of each of the following expressions :

a $(x^2+3x+4)-(5x^2+6x+7)$

b $-(2x-5x+1-4+7x)$

c $(3x+2)-5x+6-(-6x+2)$

E.8972 Give the reduced form of each of the following expressions :

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

E.8970 Give the reduced form of each of the following expressions :

a $2x^2+5-(2x-5)$ b $5-(2x-4)-2x^2+x$

E.8973 Give the reduced form of each of the following expressions :

a $-(-3x-1)-(5x-2)$

b $-(3x^2+4x-8)-(2x-4)$

E.7935 Reduce the following expressions :

a $-\left(3x^2+5x-9\right)-\left(-5x+1\right)$

b $-(x-2)+2x+2-\left(3-x^2\right)$

E.1946 Give the reduced form of each of the following expressions :

a $-(2x+x^2-4)-(-2x^2+4x-3)$

b $-(2x^2-2)+(x-2)-(2-x)$

c $3x-(2x^2+1-8x)-(3x-2x^2+7)$

E.8971 Give the reduced form of each of the following expressions :

a $+(x+1)-(3x^2+2)+[3-(2+x)]$

b $2-[3-(x-2)]$

c $-[2-(1-x)+1]-(3-2x)$

E.4598 Copy and complete the table below, linking the expressions in the left-hand table with their reduced expanded forms obtained in the right-hand table.

$(5x+5)+2(4x+1)$	•
$(4x\quad 6)\quad (3\quad x)$	•
$x(2x\quad 3)+2(1\quad x^2)\quad 5$	•
$(5\quad 2x)+x(1\quad x)+8+x^2$	•

• $3x+3$
• $3x\quad 3$
• $\quad 3x\quad 3$
• $\quad 3x+3$

4. *Parenthesis and simple distributivity*

E.1075 Expand and reduce the following expressions :

a $-3\times(2-x)$ b $-2(x+2)$

c $-2x(x-2)$ d $-2\times(3x-1)$

E.9006 Expand, then reduce the following expressions :

(a) $-2(x+5)$ (b) $-x(x+2)$

E.1929 Expand and reduce the following expressions :

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

(c) $2\times(x-1)-4(x-3)$ (d) $-2\times(x-1)+4(2x-3)$

E.8968 Expand, then reduce the following expressions :

(a) $3-4\times(3-x)$ (b) $3\times(4x-2)-2\times(3-x)$

E.9007 Expand, then reduce the following expressions :

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

E.8969 Expand, then reduce the following expressions :

(a) $3(x-2)-3(2x-1)$ (b) $(-2+3x)(-2)-(6x+2)$

(c) $3(5-2x)-2(3+2x)$ (d) $(x-2)\times 2-(2x+5)$

E.4549 Expand, then reduce the following expressions :

(a) $3x(x+2)-(-3x^2-4x)$ (b) $2(3-x+2)-2x(3-2x)$

E.1082 Expand and reduce the following expressions :

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

E.8976 Expand, then reduce the following expressions :

(a) $4x(3x-4)+2(x^2+2)$ (b) $(x^2+4x+3)-(3-x^2)$

E.4474 Expand, then reduce the following expressions :

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

(c) $2(-x^2+5x+4+x)-(3x-7)$ (d) $-2x(x+1)-2(3x-5)$

E.8967 Expand, then reduce the following expressions :

(a) $x\times(2-x)-3\times(x^2-1)$ (b) $2-(x+1)\times x$

(c) $-(2+x)\times 3+x\times(-x+1)$ (d) $-x\times(2x-4)-(3-2x^2)$

E.8975 Expand, then reduce the following expressions :

(a) $-2\big[3-7\times(2-x)\big]$ (b) $-2\big[2-(1-x)\big]$

(c) $1-2x\big[1-(x+1)\big]$

5. *Equality of literal expressions*

E.1927

Method definition : To show that two expressions are ***different***, , we show that for a value of x, their evaluation gives distinct values.

This number is then called a ***counterexample to the equality***.

Establish that the following equalities are false :

(a) $(x+1)(2x-1)=x^2+x$

(b) $3-(x^2+x)=(3x+1)(3-x)$

(c) $x^2+x+4=(5x+1)(4-5x)$

E.7927

Definition : Two expressions are ***equal*** if they have the same value, regardless of the value of x *(This is referred to as identity).*

Method : To establish an identity, we expand and simplify each expression to show that they have the ***same expanded simplified expression***.

Establish that the following identities are true :

(a) $(2x-1)(1-x)=-2x^2+3x-1$

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

E.4600 Consider the following two expressions :

$A=3x^2+5x+1$; $B=(2x+1)^2$

Justify that the expressions A and B are not equal.

E.4490 Consider the two expressions below :

$A=2x^2+x-7$; $B=3(x-2)+3$

1 (a) Evaluate the expressions A and B for $x=2$.

(b) Evaluate expressions A and B for $x=-1$.

2 Are the two expressions A and B equal for all values of x? Justify your assertion.

E.7928 Consider the following two expressions :

$C=(3x-2)(1+2x)$; $D=x\times(6x-1)-2$

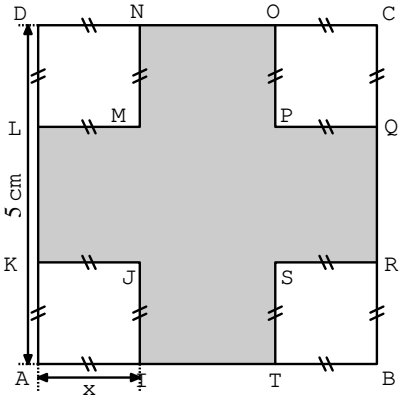
Using expansions and simplifications, show that the expressions C and D are equal.

E.4601

Consider the figure opposite:

où the quadrilaterals $ABCD$, $AIJK$, $BRST$, $COPQ$ and $DLMN$ are squares. Information on the lengths is given in the figure.

The polygon $IJKLMNOPQRST$ is designated $\mathcal{P}$.



Part A

1. We're interested in the special case where $x=2$.
   a. Determine the areas of squares $ABCD$ and $DLMN$.
   b. Deduct the area of the polygon $\mathcal{P}$ for the value $x=2$.
2. Justify that the area $\mathcal{A}$ of the polygon $\mathcal{P}$ is expressed as a function of x by: $\mathcal{A}=25-4x^2$

Part B

3. We're interested in the special case where $x=1$.
   a. Determine the areas of the rectangles $KLQR$ and $MPSJ$.
   b. Deduct the area of the polygon $\mathcal{P}$ for the value $x=1$.
4. Justify that the area of the polygon $\mathcal{P}$ is expressed as a function of x by: $\mathcal{A}=10(5-2x)-(5-2x)(5-2x)$

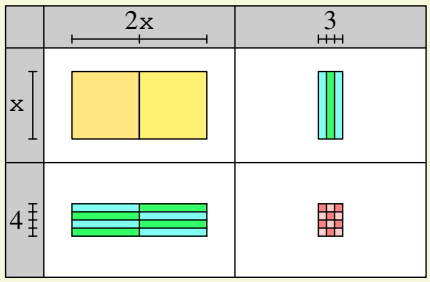
Part C

5. Justify that the expressions obtained in questions 2 and 4 are equal.

6. *Usmath*

E.9647

With American notations: to perform double distributivity, we can use a table to represent each of the products of the F.O.I.L. For example, to expand the expression $(2x+3)(x+6)$, we use the table:



We obtain the following development:

$$\underset{\text{F.}}{2x^2} + \underset{\text{O.}}{8x} + \underset{\text{I.}}{3x} + \underset{\text{L.}}{12}$$

$$2x+3 \quad x+4 = 2x^2 + 8x + 3x + 12$$

$$= 2x^2 + 11x + 12$$

1. a. Complete the table 1
   b. Deduce the reduced expansion form of the expression: $A=(2x+1)(x+4)$
2. a. Complete the table 2
   b. Deduce the reduced expansion form of the expression: $B=(x-3)(3x-1)$

	2x	1
x		
4		

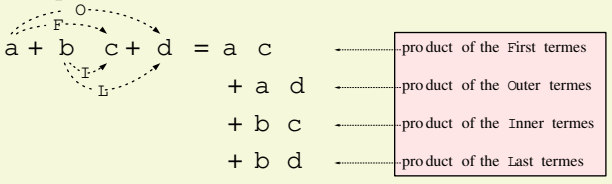
Tableau 1

	2x	1
x	$2x^2$	x
4	8x	4

Tableau 1

E.9646

With American notation: double distributivity is associated with the acronym F.O.I.L. whose four letters represent the four products:



Complete the table below to obtain the four terms obtained by double distributivity:

	Product of the			
	F. terms	O. terms	I. terms	L. terms
$(3x+2)(x+4)$				
$(x-2)(2x+1)$				
$(3-x)(5x-2)$				

E.9652

With American notation: Algebraic expressions are sometimes multiplied in columns, as shown below:

$$\begin{array}{r} 2x+3 \\ \times\ x+5 \\ \hline 10x+15 \\ +\ 2x^2+3x \\ \hline 2x^2+13x+15 \end{array} \qquad \begin{array}{r} 2x-3 \\ \times\ 2x^2-4x+3 \\ \hline 6x-9 \\ -8x^2+12x \\ +\ 4x^3-6x^2 \\ \hline 4x^3-14x^2+18x-9 \end{array}$$

Write your operations in a row and perform the following multiplications:

a. $(2x+1)(3x-2)$ b. $(3x^2-5x-1)(3x-2)$

c. $(5-2x)(x^2+1)$ d. $(x+1)(-3x^2+2x-1)$

7. *Unclassified exercises*

E.8924 Expand and reduce the following expression :

$(-3x)\times(2-x)+3\times(x^2+3)$