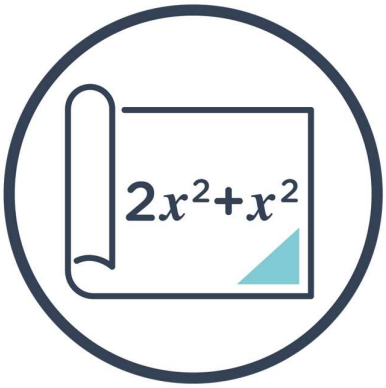
AURORE
Automatisation et rétroaction
Outils de renforcement
par exercices différenciés

Math

Algèbre – cahier 1

Calcul littéral



1. Prends ton niveau

2. Plie sur le trait pour cacher les solutions.

3. Ecris les réponses dans un cahier à côté, rien sur la feuille!

4. A la fin du temps accordé, compare tes réponses aux solutions.

5. Corrige tes erreurs et analyse-les.

6. Prêt pour le niveau suivant ? Demande à passer un test.

Allagi
Enseignons.be
school up
Cofinancé par le programme Erasmus+ de l'Union européenne

module I : réduction de sommes algébriques

module II : réduction de produits algébriques

module III : réduction de sommes et produits algébriques

module IV : calcul de puissances

module V : priorité des opérations algébriques

niv.1	4 opérations	$5x^3 . (-5x^2)^2 =$	24
niv.2	4 opérations et parenthèses	10b . 4c + 0 - 4c .2b =	25
niv.3	4 opérations, parenthèses et exposants	$[5c - (-6c)]^2 + 4c . (-2c) =$	27

module VI : distributivité simple et mise en évidence

niv.1	sans puissance	$3a . (b - 2) \leftrightarrow 3ab - 6a$	28
niv.2	avec puissance	$7a^{10}b^6 + 4a^5b^2c \leftrightarrow a^5b^2 . (7a^5b^4 + 4c)$	33

module VII : double distributivité

niv.1	jusqu'au deuxième degré	(x + 9) (x - 3)	35
niv.2	supérieur au deuxième degré	$(-c^3 + 12) . (-a^4 - 10)$	39

module VIII : produits remarquables

niv.1	application des formules	$(x - 3)^2 \rightarrow x^2 - 6x + 9$	41
niv 2	développement et distributivité	$(x - 3)^2 \leftrightarrow x^2 - 6x + 9$	42

module IX : produits remarquables

niv.1	Quotient de puissance	$16a^2c^7/b^4c^9 \leftrightarrow 16a^2/b^4c^2$	45

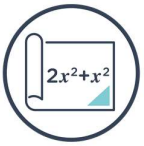
module I

réduction de sommes algébriques

niv.1 : représentations graphiques

Donne une expression littérale réduite de la représentation.

	Représentation	Expression littérale réduite	
1	a a b |___|___|_____|	2a + b	1
2	a a a a |___|___|___|___|	4 a	2
3	a b b b |___|____|____|____|	a + 3 b	3
4	a a b a a b |___|___|_____|___|___|_____|	4 a + 2 b	4
5	a a b b b |___|___|_____|_____|_____|	2 a + 3 b	5
6	a b c |___|_____|_|_|	a + b + c	6
7	a a b b c c |___|___|_____|_____|_|_|_|	2 a + 2 b + 2 c	7
8	a b b b c c c c c |___|_____|_____|_____|_|_|_|_|_|_|	a + 3 b + 5 c	8
9	a b c a b c |___|_____|_|_|___|_____|_|_|	2 a + 2 b + 2 c	9
10	a a c c c b c c c c c |___|___|_|_|_|_|_____|_|_|_|_|_|_|	2a + b + 8 c	10
11	b b c a a a |_____|_____|_|_|___|___|___|	3a + 2 b + c	11



niv.2 : valeurs numériques d'une expression littérale

Note les valeurs et calcule la valeur numérique de chaque expression.

	expression	x = 2 y = 0	x = 5 y = 0	x = 0 y = 0	x = 1 y = 2	
1	2x + 1 =	5	11	1	3	1
2	5x =	10	25	0	5	2
3	4 =	4	4	4	4	3
4	8x - 2 =	14	38	-2	6	4
5	3 - 2x =	-1	-7	3	1	5
6	100 =	100	100	100	100	6
7	5x - 5 =	5	20	-5	0	7
8	8 - 3x =	2	-7	8	-1	8
9	x + x =	4	10	0	2	9
10	x - x =	0	0	0	0	10
11	3x - 3x =	0	0	0	0	11
12	3x - 3 =	3	12	-3	0	12
13	7x + 1 =	15	36	1	8	13
14	7 + 1x =	9	12	1	8	14
15	x + y =	2	5	0	3	15
16	2x + 3y -1 =	3	9	-1	6	16
17	3y =	0	0	0	6	17
18	3z + 7 =	7	7	7	13	18
19	2y + 2x - 2 - 2y - 2x =	-2	-2	-2	-2	19
20	x + ½y =	2	5	0	2	20

module I

réduction de sommes algébriques

niv.3 : avec des naturels

Réduis les expressions littérales.

	2 termes	3 termes	4 termes		col1	col2	col3	
1	4x + 2x =	x + 2x + y =	7b + 2 + b + 1 =		6x	3x + y	8b + 3	1
2	2c + 2c =	2a - 2 + 3a =	4 + a + 4 + a =		4c	5a - 2	8 + 2a	2
3	3a + 2a =	4 + 7 + 7x =	3f + 4 + 7f + 19 =		5a	7x + 11	23 + 10f	3
4	6b + 3b =	4a + 6b - 7 =	6 + 5v + 5 + v =		9b	4a + 6b - 7	11 + 6v	4
5	6x - 2 =	9c + 2a - 4 =	3e + 5r + 6e + r =		6x - 2	9c + 2a - 4	9e + 6r	5
6	a + 2a =	3 + 2x + y =	2x + 4x + 3y + 4x =		3a	2x + y + 3	10x + 3y	6
7	x + x =	x + y + x =	3x + 3x + 3 + c =		2x	2x + y	6x + c + 3	7
8	x + 3x =	7a + 2b + a =	x + 3 + y + 2 =		4x	8a + 2b	x + y + 5	8
9	3a + 2b =	4a + 4b + 4 =	5x - 2 - 3x + y =		3a + 2b	4a + 4b + 4	2x + y - 2	9
10	x + 7y =	3x + 3b + 5 =	8y + 9 + 4y + 9x =		x + 7y	3x + 3b + 5	12y + 9x	10
11	4x + 2y =	2y + 3x + x =	x - y + 3x + 5y =		4x + 2y	2y + 4x	4x + y	11
12	x + y =	6b + 8a + 4b =	2y + 2x + 2a - y =		x + y	10b + 8a	y + 2x + 2a	12
13	3a + 3 =	9x + 2x + 2 =	a + 4x + y + 4a =		3a + 3	11x + 2	5a + 4x + y	13
14	3c + 1 =	6x - 4y + 5y =	3a - 2z + 5z - 2z =		3c + 1	6x + y	3a - z	14
15	2x + 9a =	2a - b + 3b =	2c - 3c + c + 5 =		2x + 9a	2a + 2b	5	15
16	12a + 15b =	5a + 5b + 5c =	9y - 8x + 9x - 4y =		42g	5a + 5b + 5c	5y + x	16
17	21s + 12s =	8 + 5x - 4x =	5b + 1 + 8c - 4c =		33s	x + 8	5b + 4c + 1	17
18	11y - 4y =	3a + s + s =	8a + y - 2y + 5y =		7y	3a + 2s	8a - 4y	18
19	2t - t	7a - 5b + 9b =	6x + 6y + 6z -2 =		1t	7a + 4b	6x + 6y + 6z -2	19
20	6a + 45a =	x - x + x =	2y + 3x + 2z - 2z =		51a	x	2y + 3x	20

module I

réduction de sommes algébriques

niv.4 : avec des entier (2 & 3 termes)

Réduis les expressions littérales.

	2 termes	3 termes	3 termes		col1	col2	col3	
1	-3x + 5x =	-2a - 2 - 3a =	4x - 6 + 7c =		2x	-5a - 2	7c+ 4x - 6	1
2	-2a - 2a =	15x - 5x + 7y =	-x + 2x - y =		-4a	10x + 7y	x + y	2
3	-a + a =	6x - 4x + 2y =	-2xy + xy + 4xy =		0	2x + 2y	3xy	3
4	2x - x =	3x - 7y + 4z =	3x + 6 - 2x =		x	3x - 7y + 4z	x + 6	4
5	-2a + 5a =	4y - 6x + 4y =	-5a + 3y - 5a =		3a	8y - 6x	-10a + 3y	5
6	-5a + 2a =	5z - 4z + 4a =	8x + 2a - a =		-3a	z + 4a	8x + a	6
7	3a - 4a =	2a - 3b - a =	x - x - y =		-a	a - 3b	-y	7
8	-3x - 2x =	12x - 6x + 2y =	x - 2y + y =		-5x	6x + 2y	x - y	8
9	-5x + 3x =	9x - 13y - 17x =	-x + 2x - y =		-2x	-8x - 13y	x - y	9
10	3x - 2x =	5a - 3a + 2a =	-3x - x + 5x =		x	4a	x	10
11	-7x + x =	12x - 9y + 7x =	-5xy - 4xy - xy =		-6x	19x - 9y	-10xy	11
12	2x - 3x =	x - 4y + 3z =	x - 3x + 5x =		-x	x - 4y + 3z	3x	12
13	3c - 5c =	8x - 2y + 2x =	5xy - 5xy - 4xy =		-2c	10x - 2y	-4xy	13
14	5a - 15a =	2x + 5y - 2x =	-3xy - xy + 3xy =		-10a	5y	-xy	14
15	4y - y =	5y - 6x + 7z =	-2x + 3x + 2y =		3y	5y - 6x + 7z	x + 2y	15
16	5b - 5b =	3a - 2a + 2 =	-4x - 5x - 5x =		0	a + 2	-14x	16
17	-b + b =	15a - 5a +3 =	-2xy + xy - xy =		0	10a + 3	-2xy	17
18	-2x -3x =	2y + x -2y =	-x - 4x - x =		-5x	x	-6x	18
19	-3x + x =	3x + y - 4y =	-2y - y - 2y =		-2x	3x - 3y	-5y	19
20	6x - 2a =	12x - 6 + 3 =	4y - 4y + y =		6x - 2a	12x - 3	y	20

module I

réduction de sommes algébriques

niv.4 : avec des entiers (4 termes)

Réduis les expressions littérales.

	4 termes	4 termes		col1	col2	
1	7a + 6 - 3b - a =	12a + 12 - 8a + 8 =		6a - 3b + 6	4a + 20	1
2	2a + 3b - 4a + 2b =	29 + 7a - 5a + 6 =		-2a + 5b	2a + 35	2
3	2x + 4 - 6x +y =	17a + 3c - 12a - 2c =		-4x + y + 4	5a + c	3
4	4a - b - b + 2a =	28 + 28b - 17 + 12b =		6a - 2b	40b + 11	4
5	2a - 5a + 3a - 3a =	14x + 10 - 8x - 8 =		-3a	6x + 2	5
6	12x - 4y - 8x + y =	11a + 11 - 3a - 3 =		4x - 3y	8a - 8	6
7	-3y + y + 4y + 2y =	19a + 12b - 5a + 3c =		4y	14a + 12b + 3c	7
8	2a + 3b + 3a + 2b =	4a - 6a + 5a - 3 =		5a + 5b	3a - 3	8
9	12a - 4x + 6a - x =	-2x - 2y + 3y + 3x =		18a - 5x	x + y	9
10	5y + 2y - 3y + y =	2x + x + 3x - x =		5y	5x	10
11	18z - 6y + 4z - 2y =	-2xy - 4xy + 4xy =		22z - 8y	-2xy	11
12	15x + 5 - 7x + 3x =	11x - 3y + 5x -3 =		11x + 5	16x - 3y - 3	12
13	13x - 8 + 1 - 7x =	-3y + y - 3y + y =		6x - 7	-4y	13
14	3a + 5 - 6a + 7 =	-4x + x - 2x + 3y =		-3a + 12	-5x + 3y	14
15	6x - 5x + 3 + 5x =	7a + -3c - 3b + 2a =		6x + 3	9a - 3c - 3b	15
16	11x - 20 + 3 - 4x =	-3y - 3y + 2y + 8 =		7x - 17	-4y + 8	16
17	-2y - y + y - 2y =	2xy - 4xy + 3xy + 3x =		-4y	xy + 3x	17
18	-xy + 5xy + 3xy + xy =	-3y + 4y + y + 2x =		8xy	2y + 2x	18
19	-5xy + 2xy - 3xy =	-xy + xy + 4xy + xz =		-6xy	4xy + xz	19
20	5y - y - 4y + 3y =	2xy + 4xy + 3xy + 5a =		3y	14xy + 5a	20

module I

réduction de sommes algébriques

niv.5 : avec des puissances (2 & 3 termes)

Réduis les expressions littérales.

	2 termes ²	3 termes ²	3 termes ²		col1	col2	col3	
1	$2a^2 + a^2 =$	$7 - 2a + 3y^2 =$	$-5y^2 - 5y^2 - 2y^2 =$		$3a^2$	$7 - 2a + 3y^2$	$-12y^2$	1
2	$6a^2 + 3a^2 =$	$12a^2 + 3 - b^2 =$	$y^2 - y^2 + 2y^2 =$		$9a^2$	$12a^2 + 3 - b^2$	$2y^2$	2
3	$5a^2 + 4a^2 =$	$4b^2 + 5a - 3a =$	$-y^2 - y^2 - 2y^2 =$		$9a^2$	$4b^2 + 2a$	$-4y^2$	3
4	$7a^2 - 3a^2 =$	$2x^2 - 4x^2 + 3a^2 =$	$-4x^2 - 3x^2 - 5x^2 =$		$4a^2$	$-2x^2 + 3a^2$	$-12x^2$	4
5	$2a^2 + 5a^2 =$	$2x^2 - 3x - x^2 =$	$2x^2 + 4x^2 - x^2 =$		$7a^2$	$x^2 - 3x$	$5x^2$	5
6	$3y^2 - 4a^2 =$	$a^2 + 4 - 3b =$	$-y^2 + 2y^2 - 3y^2 =$		$-4a^2 + 3y^2$	$a^2 - 3b + 4$	$-2y^2$	6
7	$3a^2 + 7a^2 =$	$12c^2 + 2a - 4 =$	$3x^2 - 4x^2 - 5x^2 =$		$10a^2$	$12c^2 + 2a - 4$	$-6x^2$	7
8	$-a^2 + 2 =$	$4a^2 + 6a^2 + 3 =$	$5a^3 + 9a^2 + 4a =$		$-a^2 + 2$	$10a^2 + 3$	$5a^3 + 9a^2 + 4a$	8
9	$11y^2 + 6y^2 =$	$5a + 2a - 3a^2 =$	$c^3 - c^2 + 2c^3 =$		$17y^2$	$- 3a^2 + 7a$	$3c^3 - c^2$	9
10	$9b^2 - 8y^2 =$	$3x^2 - 4x + 7 =$	$8x^2 + 2a^2 - a^3 =$		$9b^2 - 8y^2$	$3x^2 - 4x + 7$	$-a^3 + 2a^2 + 8x^2$	10
11	$a^2 + 3c^2 =$	$3x^2 - 2y - 3x^2 =$	$14a^3 - 8a^2 + 1 =$		$a^2 + c^2$	$-2y$	$14a^3 - 8a^2 + 1$	11
12	$2a^2 - a^2 =$	$a^2 + 2ab + b^2 =$	$x^3 - 2x^3 + y^3 =$		a^2	$a^2 + b^2 + 2ab$	$-x^3 + y^3$	12
13	$2a^2 + a^2 =$	$13x^2 - 3x - 4c =$	$z + 2z + z^2 =$		$3a^2$	$- 4c + 13x^2 - 3x$	$z^2 + 3z$	13
14	$a^2 + a =$	$a^2 + 4a^2 - 6a =$	$0z^3 - 4z^3 + z^2 =$		$a^2 + a$	$5a^2 - 6a$	$- 4z^3 + z^2$	14
15	$5y^2 - 8y^2 =$	$4x^2 - x^2 + 2x =$	$5a + 3a^2 - 8a =$		$-3y^2$	$3x^2 + 2x$	$3a^2 - 3a$	15
16	$a^2 - b^2 =$	$-y^2 - 3b^2 + 3y^2 =$	$7x^3 + 2x^2 + y^3 =$		$a^2 - b^2$	$2y^2 - 3b^2$	$7x^3 + y^3 + 2x^2$	16
17	$10a - a^2 =$	$-x^2 + x - 4x^2 =$	$4b^3 - 5b^3 - 2a^2 =$		$- a^2 + 10a$	$-5x^2 + x$	$- 2a^2 - b^3$	17
18	$-4x^2 - x^2 =$	$3y^2 + y^2 + 2y =$	$7a^3 - 6x + a^3 =$		$-5x^2$	$4y^2 + 2y$	$8a^3 - 6x$	18
19	$y^2 - 2y^2 =$	$-5x^2 + y + x =$	$3b^2 - 4a^2 + 3b^2 =$		$-y^2$	$5x^2 + y + x$	$- 4a^2 + 6b^2$	19
20	$-5a^2 - x^2 =$	$2x^2 + 4x^2 - 4x =$	$2x^3 + 5x^3 - 7x^3 =$		$-5a^2 - x^2$	$6x^2 - 4x$	0	20

module I

réduction de sommes algébriques

niv.5 : avec des puissances (4 ou 5 termes)

Réduis les expressions littérales.

	4 termes 3-5	4 - 5 termes 3-5		col1	col2	
1	$-2x^2 + 2x^3 - x^3 - 4y^3 =$	$8x - 7c + 4a^2 - 7c =$		$x^3 - 4y^3 - 2x^2$	$4a^2 - 14c + 8x$	1
2	$4b^2 - 6a + 3c - 4b^2 =$	$x^3 - 4x^3 + 2a + 2a^2 =$		$-6a + 3c$	$-3x^3 + 2a^2 + 2a$	2
3	$-4x^2y + 4x^2y - xy + xy^2 =$	$4x - x^4 + 8x^3 + 6x^4 =$		$-xy + xy^2$	$5x^4 + 8x^3 + 4x$	3
4	$3y^2 + 4y^3 - 3x^2 - y^2 =$	$-2y + 5y^2 + y + z^3 =$		$4y^3 + 2y^2 - 3x^2$	$+ 5y^2 - y + z^3$	4
5	$16x - 7a + 8x - 8a^2 =$	$12c - 4a^2 + 3c + 6a^2 =$		$- 8a^2 - 7a + 24x$	$2a^2 + 15c$	5
6	$2x^3 + 3x^3 - x + 4x^4 =$	$5xy - 4xy + 2z^3 - 8 =$		$4x^4 + 5x^3 - x$	$xy + 2z^3 - 8$	6
7	$-9a^2 - 7c - 2c + 3a^2 =$	$-4a^2 - 4x^2 + 4x^2 + 3 =$		$-6a^2 - 9c$	$-4a^2 + 3$	7
8	$12a^2 + 2a - 12a^2 + 3 =$	$-5x^3y - 2x^3y - 3a + 4 =$		$2a - 3$	$-7x^3y - 3a + 4$	8
9	$3x^2y - 5x^2y + 3xy + b^3 =$	$8a^2 - b^2 - 5 + 2b^2 =$		$-2x^2y + 3xy + b^3$	$8a^2 + b^2 - 5$	9
10	$y^2 - 3y + 4y^2 + z^2 =$	$-5a^3 + 3a^3 - x^3 - 2x^3 =$		$5y^2 + z^2 - 3y$	$-2a^3 - 3x^3$	10
11	$12c - 5a + 3a^2 + 5a =$	$5a^2 - 4b^2 - x^2 + 2x^2 =$		$3a^2 + 12c$	$5a^2 - 4b^2 + x^2$	11
12	$-2b^2 - 3a^2 - 2y + 3y^3 =$	$-y + 3y^3 + 5y^2 + 2y^2 =$		$3y^3 - 3a^2 - 2b^2 - 2y$	$3y^3 + 7y^2 - y$	12
13	$x + 2x^3 + 5x^0 - 5 =$	$-5a^2 + 3z^2 + y^2 - y^2 =$		$2x^3 + x$	$-5a^2 + 3z^2$	13
14	$6ab^3 - 4ac^3 + 4a^2 - a^2 =$	$-2c^2 + 5c^3 - 2c^2 + a^3 =$		$6ab^3 - 4ac^3 + 3a^2$	$a^3 + 5c^3 - 4c^2$	14
15	$x^2 + 2x - 3x^3 - x^2 =$	$4y^2 + 3y^2 + 2y^2 - 2y^2 =$		$-3x^2 + 2x$	$7y^2$	15
16	$5t - m + 6m^2 - 1 =$	$2m - 4p^2 + 5p^3 - p^2 =$		$6m^2 - m + 5t - 1$	$5p^3 - 5p^2 + 2m$	16
17	$y^2 - 5a^2 + 4a^2 - 8a^2 =$	$d^4 + 9d^3 - 2p^3 + 4p^3 =$		$y^2 - 9a^2$	$d^4 + 9d^3 + 2p^3$	17
18	$-6t^3 - 5t^2 + a^3 + 5t^2 =$	$0t^4 - 0d^3 + 7t^4 - 8 =$		$a^3 - 6t^3$	$7t^4 - 8$	18
19	$x^4 - 4x + 2x^4 - 6 =$	$c^3 + 8a^2 - 7a^3 - c^3 =$		$3x^4 - 10x$	$- 7a^3 + 8a^2$	19
20	$y^3 + 2x^3 + 5y^3 - 1 =$	$5a^3 - 7a^2 + 8a^3 - b^2 =$		$2x^3 + 6y^3 - 1$	$13a^3 - 7a^2 - b^2$	20

module I

réduction de sommes algébriques

niv.6 : avec des parenthèses (3 termes)

Ecris les expressions suivantes sans parenthèses.

	3 termes - sans p	3 termes - sans p		col1	col2	
1	-(a + b) =	-12y - (4y + 8y) =		-a -b	-24y	1
2	-(-a + b) =	x + (6x - 3x) =		a - b	4x	2
3	-(a - b) =	x + (5 + 2x) =		-a + b	3x + 5	3
4	-(-a - b) =	-3y - (y - 3y) =		a + b	-y	4
5	3x - (y + 2) =	5x - (-2 + 20) =		x + 5y - z	5x + 18	5
6	-4a - (2b + c) =	2x + (3x - x) =		-4a - 2b - c	4x	6
7	x - (y - z) =	-4xy - (-3xy + 4xy) =		x - y + z	5xy	7
8	-a + (-b + 2) =	2y - (-3y - y) =		-a - b +2	6y	8
9	x - (-5y + z) =	4y - (y - y) =		3x - y -2	5x + 18	9
10	-5b - (5 + a) =	3x - (-x + 4x) =		-a-5b - 5	-6x	10
11	15a - (5a + 3) =	-3 + (5 + x) =		10a -3	x + 2	11
12	3 - (3x - y) =	5xy - (4xy + 4xy) =		- 3x +y+3	-3xy	12
13	-3x + (-3 + 4x) =	xy - (3xy + 2xy) =		x - 3	-4xy	13
14	5x - (5 - x) =	-4xy - (xy - 3xy) =		6x - 5	-2xy	14
15	-(-5a + 6c) +3 =	-y - (-5y + 3y) =		5a - 6c + 3	y	15
16	-(-4) - (x + 3) =	c + (4 - c) =		-x + 1	4	16
17	a + (-2b + 2) =	-2b - (-4b + 3b) =		a - 2b + 2	-b	17
18	2a + (-3c - d) =	-4 + (8 + 12) =		2a - 3c - d	16	18
19	2a - (4a + b) =	7d - (-d - 4d) =		-2a - b	12d	19
20	d - (-4 + 2d) =	4b - (b + 8) =		-3d + 4	3b - 8	20

module I

réduction de sommes algébriques

niv.6 : avec des parenthèses (4 termes)

Ecris les expressions suivantes sans parenthèses.

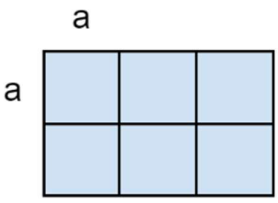
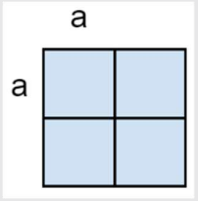
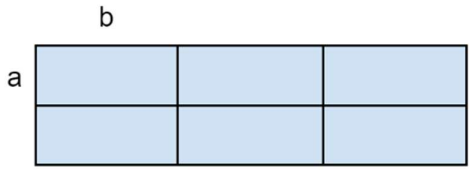
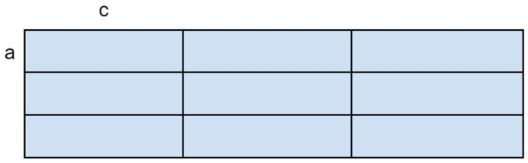
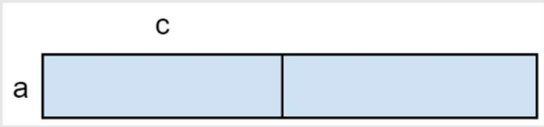
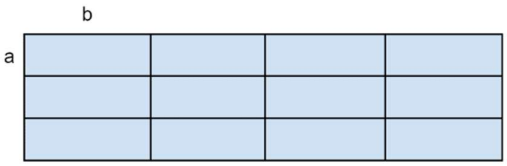
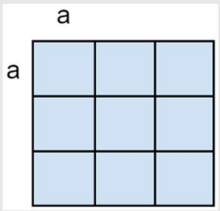
	4 termes - avec p	4 termes - avec p		col1	col2	
1	$3x^3 - [2x^3 - (4x^3 + 5x^3)] =$	$(-2x^2 + 5x^2) - (4x^2 - 4x^2) =$		$-4x^3$	$3x^2$	1
2	$(-x^3 + 4x^3) - (4x^3 + 3x^3) =$	$y^2 - [-y^2 - (2y^2 + 2y^2)] =$		$-4x^3$	$6y^2$	2
3	$(x^2 - 2x^2) - (-x^2 + 4x^2) =$	$-2x^2 - [3x^2 - (5x^2 - 3x^2)] =$		$-4x^2$	$-3x^2$	3
4	$-(a + b) + (a - b) =$	$-5x^2 - [-2x^2 - (-2x^2 - 5x^2)] =$		$-2b$	$-10x^2$	4
5	$(a -b) + (a - b) =$	$(-x^3 + 2x^3) - (x^3 + 5x^3) =$		$2a - 2b$	$-5x^3$	5
6	$(x^2y - 4x^2y) - (-3x^2y - 2x^2y) =$	$(3x^3 + 2x^3) - (3x^3 - 4x^3) =$		$-10x^2$	$6x^3$	6
7	$2y^2 - [-y^2 - (-4y^2 - y^2)] =$	$(4x^2y + 2x^2y) - (x^2y + 4x^2y) =$		$2y^2$	x^2y	7
8	$-4x^3 - (x^3 + 2x^3) =$	$-2x^3 - (-4x^3 - 4x^3) + 3x^3 =$		$-7x^3$	$9x^3$	8
9	$(2x^2 + 4x^2) - (4x^2 - x^2) =$	$-2x^2y - [4x^2y - (2x^2y - 4x^2y)] =$		$3x^2$	$-8x^2y$	9
10	$(-3y^2 + 4y^2) - (-y^2 + 4y^2) =$	$(-x^2 - 4x^2) - (-2x^2 - 5x^2) =$		$-2y^2$	$2x^2$	10
11	$3a^2 - (6c + 8b - 3a^2) =$	$(3x^2y + x^2y) - (-x^2y + x^2y) =$		$6a^2 - 6c - 8b$	$4x^2y$	11
12	$20a^2 - 4c + (-8 - 6a^2) =$	$(2x^3 + x^3) - (-x^3 - x^3) =$		$14a^2 - 4c - 8$	$5x^3$	12
13	$(4y^2 - 4y^2) - (-2y^2 - y^2) =$	$(-4x^2 - 4x^2) - (3x^2 - 2x^2) =$		$3y^2$	$-9x^2$	13
14	$(2x^3 + 4x^3) - (-x^3 - 5x^3) =$	$(-5x^2 - 2x^2) - (x^2 - 4x^2) =$		$12x^3$	$-4x^2$	14
15	$11a^2 - 3b - (4a^2 + 5\ b) =$	$(-3x^2y + x^2y) - (-4x^2y + x^2y) =$		$7a^2 - 8b$	x^2y	15
16	$-(-3y + x) - (-4x + 7y) =$	$2x^3 - [-2x^3 - (2x^3 - 4x^3)] =$		$-4y + 3x$	$2x^3$	16
17	$10x -(4x + 2) - (-2x) =$	$(-3x^2y - 4x^2y) - (3x^2y + x^2y) =$		$8x - 2$	$-11x^2y$	17
18	$8x + 5 - (7x^2 - 4) =$	$(-4x^3 - x^3) - (-2x^3 + 4x^3) =$		$-7x^2 + 8x + 9$	$-7x^3$	18
19	$-(2x- 1) - (-4x + 3) =$	$(-x^2 - 3x^2) - (-3x^2 + 5x^2) =$		$2x - 2$	$-6x^2$	19
20	$-(-a - b) + (a + b) =$	$(x^2 - 3x^2) - (5x^2 + 3x^2) =$		$2a + 2b$	$-10x^2$	20

module II

réduction de produits algébriques

niv.1 : représentations graphiques

Donne une expression littérale réduite de la représentation.

1		$6\ a^2$	1
2		$4\ a^2$ $= (2a)^2$	2
3		$6\ ab$	3
4		$3\ ab$	4
5		$9\ ac$	5
6		$2\ ac$	6
7		$12\ ab$	7
8		$9\ a^2$ $= (3a)^2$	8

module II

réduction de produits algébriques

niv.2 : calcul avec valeurs

Note les valeurs et calcule la valeur numérique de chaque expression.

	expression	x = 2 y = 1	x = 5 y = 0	x = 0 y = 1	x = 1 y = 2	
1	$3y^2 . x =$	6	0	0	12	1
2	$y . 4x^2 =$	16	0	0	8	2
3	$2x . 2y^4 =$	8	0	0	4	3
4	$5x . 5x^3 =$	400	5^6	0	25	4
5	$2y^6 . 3x^2 =$	24	0	0	384	5
6	$4x^4 . 5y^2 =$	320	0	0	80	6
7	$2x . 2x^3 =$	64	1250	0	4	7
8	$x . x^5 =$	64	5^6	0	1	8
9	$3x . 7x^2 =$	168	2625	0	21	9
10	$8y^2 . 2y^3 =$	16	0	16	512	10
11	$3x^2 . 2y =$	24	0	0	12	11
12	$4x^3 . x =$	64	2500	0	4	12
13	$x^0 . y^2 =$	1	0	0	4	13
14	$x^2 . 3y^3 =$	12	0	0	24	14
15	$5 . x^4 =$	80	5^5	0	5	15
16	$2x^3 . 4x^3 =$	512	$8 . 5^6$	0	8	16
17	$7y^0 . 7y^1 =$	49	0	49	49	17
18	$3x^3 . 4x =$	384	$12 . 5^4$	0	12	18
19	$y . y^8 =$	1	0	1	2^9	19
20	$4x . 4y^3 =$	32	0	0	128	20

module II

réduction de produits algébriques

niv.3 : avec des naturels

Réduis les expressions littérales.

	2 facteurs	2 facteurs - avec P	3 facteurs - avec P	col1	col2	col3	
1	2a . 3b =	$3a^2$. x =	2x . 3y . 2z =	6ab	$3a^2x$	12xyz	1
2	3a . 5 =	y . $4x^2$ =	a . 2b . 3c =	15a	$4x^2y$	6abc	2
3	3x . 4x =	2b . $2y^4$ =	3x . 2y . 3x =	$12x^2$	$4by^4$	$18x^2y$	3
4	3x . 2x =	5x . $5x^3$ =	$3x^2$. 2y . 2x =	$6x^2$	$25x^4$	$12x^3y$	4
5	x . 2x =	$2a^6$. $3x^2$ =	2a . $4a^2$. 3b =	$2x^2$	$6a^6x^2$	$24a^3b$	5
6	4y . y =	$4b^4$. $5a^2$ =	5x . 2x . y =	$4y^2$	$20a^2b^4$	$10x^2y$	6
7	a . 3a =	2z . $2z^3$ =	2x . 6y . 2x =	$3a^2$	$4z^4$	$24x^2y$	7
8	3x . 3 =	x . x^5 =	$4x^4$. 3y . $2x^2$ =	9x	x^6	$24x^6y$	8
9	xy . x =	3b . $7a^2$ =	13x . $2y^2$. x =	x^2y	$21a^2b$	$26x^2y^2$	9
10	a . 2 =	$8y^2$. $2y^3$ =	$3x^2$. 2y . $2x^2$ =	2a	$16y^5$	$12x^4y$	10
11	3x . 5 =	$3x^2$. 2y =	3x . 3x . 6y =	15x	$6x^2y$	$54x^2y$	11
12	6x . 7x =	$4a^3$. a =	3y . 4xz . 2x =	$42x^2$	$4a^4$	$24x^2yz$	12
13	15 . x =	a^0 . a^2 =	2y . x . $2b^2$ =	15x	a^2	$4b^2xy$	13
14	6a . 2b =	c^2 . $3d^3$ =	5y . $2a^2$. $2y^3$ =	12ab	$3c^2d^3$	$20a^2y^4$	14
15	a . 4a =	5 . c^4 =	4a . $7b^2$. $2a^2$ =	$4a^2$	$5c^4$	$56a^3b^2$	15
16	5b . 3c =	$2d^3$. $4d^3$ =	$4x^4$. x . 2x =	15bc	$8d^6$	$8x^6$	16
17	2a . 8a =	$7a^0$. $7b^1$ =	5ab^2 . 3 . x =	$16a^2$	49b	$15ab^2x$	17
18	5c . 6a =	$3x^3$. 4x =	x^2 . 4x . y^3 =	30ac	$12x^4$	$4x^3y^3$	18
19	11x . 3x =	y . y^8 =	y . 3z . 5y =	$33x^2$	y^9	15yz	19
20	4 . 5x =	4c . $4c^3$ =	7 . 4y . $2bx^2$ =	20x	$16c^4$	$56bx^2y$	20

module II

réduction de produits algébriques

niv.4 : avec des entiers

Réduis les expressions littérales.

	2 facteurs	2 facteurs	2 facteurs		col1	col2	col3	
1	$-3a \cdot 2b =$	$-6c^3 \cdot 3b^0v =$	$-4b^3 \cdot (-2b^4) =$		$-6ab$	$-18c^3$	$8b^7$	1
2	$-2x \cdot (-2y) =$	$-8c^6 \cdot (-7b^6) =$	$7a \cdot (-4a^5) =$		$4xy$	$56b^6c^6$	$-28a^6$	2
3	$-4 \cdot 3x =$	$8a^0 \cdot 3b^6 =$	$-2x \cdot (-2x^4) =$		$-12x$	$24b^6$	$4x^5$	3
4	$-4a \cdot (-2a) =$	$-7b^8 \cdot (-9a^7) =$	$3z \cdot 5x^7 =$		$8a^2$	$63a^7b^8$	$15x^7z$	4
5	$-5 \cdot (-3a) =$	$8a^2 \cdot (-8a^8) =$	$-2a \cdot 4a^4 =$		$15a$	$-64a^{10}$	$-8a^5$	5
6	$3 \cdot (-2a) =$	$2a^0 \cdot 7c^4 =$	$7z \cdot (-5b^5) =$		$-6a$	$14c^4$	$-35b^5z$	6
7	$-7 \cdot (-3x) =$	$-b^4 \cdot 7c^3 =$	$-2y \cdot (5y^9) =$		$21x$	$-7b^4c^3$	$-10y^{10}$	7
8	$x \cdot (-2y) =$	$5a^2 \cdot (-3b^5) =$	$7a^4 \cdot 2a^5 =$		$-2xy$	$-15a^2b^5$	$14a^9$	8
9	$-x \cdot 2x =$	$-9a^4 \cdot 8c =$	$(-8b^2) \cdot (-3b^4) =$		$-2x^2$	$-72a^4c$	$24b^6$	9
10	$-3x \cdot (-2y) =$	$-5a^7 \cdot 2a =$	$4c^5 \cdot d^6 =$		$6xy$	$-10a^8$	$4c^5d^6$	10
11	$3 \cdot (-6a) =$	$-8a^0 \cdot (-a^5) =$	$(-6b^5) \cdot (-2b^9) =$		$-18a$	$8a^5$	$12b^{14}$	11
12	$5b \cdot (-3c) =$	$7b^8 \cdot (-9b^8) =$	$3x^4 \cdot (-3a^3) =$		$-15bc$	$-63b^{16}$	$-9a^3x^4$	12
13	$a \cdot (-a) =$	$4b^7 \cdot 6c^3 =$	$4ab^2 \cdot (-2ab^2) =$		$-a^2$	$24b^7c^3$	$-8a^2b^4$	13
14	$-6a \cdot (-4b) =$	$3a^6 \cdot (-b^0) =$	$5abc \cdot 5abc^3 =$		$24ab$	$-3a^6$	$25abc^4$	14
15	$4b \cdot (-3c) =$	$-9c^7 \cdot 9b^5 =$	$2b^2 \cdot 6b^5 =$		$-12bc$	$-81b^5c^7$	$12b^7$	15
16	$-a \cdot 2a^2 =$	$2c^6 \cdot 4a^2 =$	$(-3y^7) \cdot (b^2) =$		$-2a^3$	$8a^2c^6$	$-3b^2y^7$	16
17	$7c \cdot (-3) =$	$2b^0 \cdot (-2b^5) =$	$8x \cdot 11x^4 =$		$-21c$	$-4b^5$	$88x^5$	17
18	$-3x \cdot (-y) =$	$-a^6 \cdot (-4b^8) =$	$-12z^2 \cdot (7y^5) =$		$3xy$	$4a^6b^8$	$-84y^5z^2$	18
19	$-2c \cdot a =$	$a^7 \cdot 7b^0 =$	$2a^2 \cdot (-6a^2) =$		$-2ac$	$7a^7$	$-12a^4$	19
20	$-2x \cdot 2y =$	$-5c^4 \cdot (-4b^7) =$	$5c^3 \cdot (-2b^3) =$		$-4xy$	$20b^7c^4$	$-10b^3c^3$	20

module II

réduction de produits algébriques

niv.4 : avec des entiers

Réduis les expressions littérales.

	3 facteurs	3 facteurs	3 facteurs	col1	col2	col3	
1	-2 . (-a) . (-2b) =	$4a^4$. $(-5c^8)$. b^8 =	$-4b^3$. $9b^6$. 5a =	-4ab	$-20a^4b^8c^8$	$180b^9a$	1
2	-3x . 2y . (-2z) =	$2b^3$. $(-7c^3)$. a^4 =	$-8b^5$. $6a^3$. $4a^3$ =	12xyz	$-14a^4b^3c^3$	$-192b^5a$	2
3	$-a^2$. 2 . (-b) =	$(-4z^6)$. $3x^2$. 2 =	$8b^8$. $(-b^0)$. $(-b^8)$ =	$2a^2$ b	$-24x^2z^6$	$8b^{16}$	3
4	6 . x^2 . (-x) =	$5b^4$. $(5b^0)$. $(-a^5)$ =	4c . $2c^6$. $(-5a^3)$ =	$-6x^3$	$-25a^5b^4$	$-40c^7a^3$	4
5	-x . y . x =	3c . $(-9x^2)$. b^3 =	3c . c . $3a^2$ =	$-x^2y$	$-27b^3cx^2$	$9c^2a^2$	5
6	-3x . 4z . (-5y) =	$(-5a^2)$. 3b . (-1) =	$3a^8$. $2c^3$. $(-c^8)$ =	60xyz	$15a^2b$	$-6a^8c^{11}$	6
7	-2a . 3b . a^2 =	4z . $(-z^3)$. 8 =	-3a . (-2c) . $4c^3$ =	$-6a^3b$	$-32z^4$	$24ac^4$	7
8	4x . 2y . (-y) =	4d . (-5y) . c^2 =	$6c^8$. $7c^7$. $5c^7$ =	$-8xy^2$	$-20c^2dy$	$210c^{22}$	8
9	-5x . 3x . y =	$(-6b^3)$. 4c . 2 =	$3a^4$. b^4 . $3b^3$ =	$-15x^2y$	$-48b^3c$	$9a^4b^7$	9
10	-2x . (-2y). 3 =	$(-2x^2)$. $2x^3$. $2a^4$ =	$6a^6$. $6c^0$. $3c^0$ =	12xy	$-8a^4x^5$	$108a^6c$	10
11	-4x . 2y.(-6x) =	5x . $(-4z^2)$. x =	$-2c^5$. $6b^4$. $5a^6$ =	$48x^2y$	$-20x^2z^2$	$-60a^6b^4c^5$	11
12	-2x . (-4) . 3x =	$(-7x^2)$. $2x^3$. 3 =	8a . (-3a) . $(-2a^3)$ =	$24x^2$	$-42x^5$	$48a^5$	12
13	x . (-2x) . y =	$4z^5$. 2 . $(-6x^4)$ =	$-5b^6$. $2b^4$. $(-3a^5)$ =	$-4x^2y$	$-48x^4z^5$	$30a^5b^{10}$	13
14	x . y . (-z) =	6y . $(-3a^3)$. 2a =	$-5c^5$. $5c^6$. $(-c^5)$ =	-xyz	$-36a^5y$	$25c^{16}$	14
15	2j . (-t) . 3m =	(4y) . $(-2b^3)$. y^5 =	$6b^3$. $2c^2$. $(-2b^8)$ =	-6jmt	$-8b^3y^6$	$-24b^{11}c^2$	15
16	-x . x . y =	$3c^3$. 5 . $(-7a^2)$ =	-5a . $7c^7$. $5a^5$ =	$-x^2y$	$-105a^2c^3$	$-175a^6c^7$	16
17	$-a^4$. $6c^8$. $(-3b^8)$ =	7z . (b^4) . $3b^3$ =	$7a^5$. $(-5c^2)$. 5c =	$18a^4bc^8$	$21b^4z$	$175a^5c^3$	17
18	$3a^5$. $2c^2$. $2a^4$ =	$3a^2$. 2x . $3z^4$ =	$8a^5$. $(-4b^5)$. a =	$12a^9c^2$	$18a^2xz^4$	$-32a^6b^5$	18
19	$6c^5$. 6b . $(-4c^8)$ =	$9a^2$. $(-2x^2)$. 0 =	7a . $3c^3$. $(-3a^7)$ =	$-144bc^{13}$	0	$-63a^8c^3$	19
20	a^5 . (-5b) . $(-a^3)$ =	$2a^7$. $(-c^5)$. 3 =	$5c^7$. $7a^0$. $(-4a^4)$ =	$5a^8b$	$-6a^7c^5$	$-140a^2c$	20

module III

réduction de sommes et produits algébriques

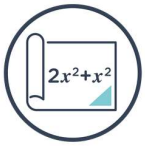
niv.1 : avec des entiers

Réduis les expressions littérales.

	colonne 1	colonne 2	colonne 3	col1	col2	col3	
1	a + b =	0 . 3d =	12f . 4x =	a + b	0	48fx	1
2	a + a =	a . (-a) =	2x - 2xb =	2a	a^2	2x - 2xb	2
3	a . b =	3 . 3xy =	3s . a =	ab	9xy	3as	3
4	-a . b =	-2a . (-a) =	4k - 6k =	-ab	$2a^2$	-2k	4
5	-a . (-b) =	7a - 4a =	(-2) . (4) =	ab	3a	8	5
6	6 + (-8y) =	2x . (-3x) =	60a - 60a =	6 - 8y	$- 6x^2$	0	6
7	2x . (-x) =	7e - 3a =	(-9) . (-4s) =	$-2x^2$	7e - 3a	36s	7
8	(x+3) + (4x-5) =	-4x . (-2x) =	(2x+7) + (3x-6) =	5x - 2	$8x^2$	5x - 1	8
9	12x - 6x =	2x - 3x =	12 . (-3xz) =	6x	x	-36xz	9
10	(9x+a) - (3x+a) =	a . (-2) =	-7x + 4 + 2 =	6x	-2a	-7x + 6	10
11	12x . 4x =	6y - (5y) =	8 . 4x =	$48x^2$	y	32x	11
12	(a+9) + (8+23a) =	3 . x =	10z + 8z =	24a +17	3x	18z	12
13	-a . 4a =	5x - (-4x) =	8b . c =	$-4a^2$	x	8bc	13
14	-x . y + 1 =	5d . (-6d) =	2x + 9a =	1 - xy	$-30d^2$	2x + 9a	14
15	45a - 44a =	-9x + 2x =	3x - 7y =	a	-7x	3x - 7y	15
16	-3d . (-z) =	(2a - 4 +7a) - 3a =	(2+4-7) + 4d =	3dz	6a - 4	-1 + 4d	16
17	(-4x-16x) + (5x+3) =	7x . 2c =	3x - 4a =	x - 13	14cx	3x - 4a	17
18	-4 . 2b =	(5c+2) - (4c-3) =	(8c-32) - (17+3c) =	-8b	c + 5	5c - 49	18
19	(3a+a) - (7a+3) =	b . (-d) . (-2) =	8 . (-a) =	-3a - 3	2bd	-8a	19
20	6b . (-3) =	14a . b =	10c . (-3b) =	-18b	14ab	-30cb	20

module III

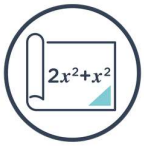
réduction de sommes et produits algébriques



niv.2 : avec des parenthèses et puissances >2

Réduis les expressions littérales.

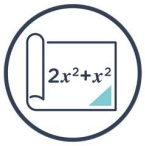
	colonne 1	colonne 2		col1	col2	
1	$-4y^2 - (5y^2 - 3y^2) =$	$5a^0 \cdot 6c^6 =$		$-6y^2$	$30c^6$	1
2	$-8a^8 \cdot (-6b^0) =$	$4y^2 - [y^2 - (-3y^2 - 3y^2)] =$		$48a^8$	$-3y^2$	2
3	$(-y^2 - 2y^2) - (y^2 - 2y^2) =$	$-2b^5 \cdot 7a^3 =$		$-2y^2$	$-14b^5a^3$	3
4	$-7c^0 \cdot 4a^7 \cdot (-4a^0) =$	$(-y^2 + y^2) - (y^2 + 3y^2) =$		$56a^7$	$-4y^2$	4
5	$-2x^2y - (5x^2y - 4x^2y) =$	$-6c^2 \cdot 7c^0 \cdot 3b^4 =$		$-3x^2y$	$-126b^4c^2$	5
6	$-5b^0 \cdot (-a) =$	$-3x^2y - (-2x^2y - 4x^2y) =$		$5a$	$3x^2y$	6
7	$2xy - [5xy - (3xy + 3xy)] =$	$5b^8 \cdot (-4c^6) \cdot 2a^5 =$		$3xy$	$-40a^5b^8c^6$	7
8	$4c^4 \cdot (-8c^6) \cdot (-3c) =$	$5x^2 - [-3x^2 - (-x^2 + 2x^2)] =$		$96c^{11}$	$9x^2$	8
9	$3y^2 - (-4y^2 - y^2) =$	$a^8 \cdot (-5a^3) =$		$8y^2$	$-5a^{11}$	9
10	$-8b \cdot (-b) \cdot 2c^3 =$	$-x^2 - (4x^2 + 2x^2) =$		$16b^2c^3$	$-7x^2$	10
11	$(-5y^2 + 5y^2) - (3y^2 + 4y^2) =$	$-9c^3 \cdot (-3c^4) \cdot 3a^3 =$		$-7y^2$	$81a^3c^7$	11
12	$5a^2 \cdot 4c^0 \cdot 2b^5 =$	$(5y^2 + y^2) - (2y^2 - 4y^2) =$		$40a^2b^5$	$8y^2$	12
13	$2y - [-5y - (-5y + 3y)] =$	$-7b^2 \cdot 2a^0 \cdot (-4c^8) =$		$5y$	$56b^2c^8$	13
14	$2c^4 \cdot 7b^6 \cdot b^0 =$	$(4x^2 + 3x^2) - (-5x^2 - x^2) =$		$14b^6c^4$	$13x^2$	14
15	$4x^3 - (x^3 + 4x^3) =$	$5b^3 \cdot 2c^2 \cdot 4a^0 =$		$-x^3$	$40b^3c^2$	15
16	$-2a \cdot (-5a^8) =$	$5y^2 - (y^2 + y^2) =$		$10a^9$	$3y^2$	16
17	$(-2x^3 + 4x^3) - (-x^3 - 2x^3) =$	$3a^2 \cdot (-8b^5) =$		$5x^3$	$-24a^2b^5$	17
18	$-9b^4 \cdot 2c^5 =$	$x^3 - (2x^3 + 2x^3) =$		$-18b^4c^5$	$-3x^3$	18
19	$(2y^2 - 5y^2) - (y^2 + y^2) =$	$6a^2 \cdot 8b^6 =$		$-5y^2$	$48a^2b^6$	19
20	$6c^4 \cdot (-9b^3) =$	$(x^2 + 3x^2) - (-5x^2 + x^2) =$		$-54c^4b^3$	$8x^2$	20



niv.1 : produit / quotient de puissances (même base)

Applique les propriétés des puissances.

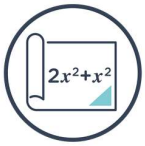
	produits	quotients	produits et quotients		produits	quotients	produits et quotients	
1	$a^2 . a^4 =$	$\frac{a^3}{a^2} =$	$\frac{16a^2c^7}{b^4c^9} =$		$a^{2+4} = a^6$	$a^{3-2} = a$	$\frac{16a^2}{b^4c^2}$	1
2	$b^5 . b^2 =$	$\frac{c^4}{c^3} =$	$\frac{a^9c}{12a^5c} =$		$b^{5+2} = b^7$	$c^{4-3} = c$	$\frac{a^4}{12}$	2
3	$d^3 . d^6 =$	$\frac{d^3}{a^3} =$	$\frac{12a^4c^4}{10} =$		$d^{3+6} = d^9$	$\frac{d^3}{a^3}$	$\frac{6a^4c^4}{5b^5}$	3
4	$c . c^7 =$	$\frac{b^6}{b^4} =$	$\frac{4a^9c^4}{5b^5c^8} =$		$c^{1+7} = c^8$	$b^{6-4} = b^2$	$\frac{4a^9}{5b^5c^4}$	4
5	$x^5 . x^2 =$	$\frac{d}{d^2} =$	$\frac{16b}{6b^4} =$		$x^{5+2} = x^7$	$d^{1-2} = d^{-1} = \frac{1}{d}$	$\frac{8}{3b^3}$	5
6	$y^3 . y^4 =$	$\frac{3z^3}{z^3} =$	$\frac{-8b^5c^2}{b^7} =$		$y^{3+4} = y^7$	$3z^{3-3} = 3z^0 = 3$	$\frac{-8c^2}{b^2}$	6
7	$z^5 . 2z^3 =$	$\frac{a^6}{ab} =$	$\frac{8b^6c^8}{-18a^2c^2} =$		$2z^{5+3} = 2z^8$	$a^{6-1}b^{0-1} = a^5b^{-1} = \frac{a^5}{b}$	$\frac{-4b^6c^9}{9a^2}$	7
8	$4a^9 . b =$	$\frac{a^4}{6x^3} =$	$\frac{a^5c^6}{10a^3c^6} =$		$4a^9b$	$\frac{1}{6}a^4 . x^{0-3} =$ $\frac{1}{6}a^4 . x^{-3}$	$\frac{a^2}{10}$	8
9	$5c^6 . 3c^2 =$	$\frac{3a^3}{6a^2} =$	$\frac{-4b^8c^5}{-3b} =$		$15c^{2+6} = 15c^8$	$\frac{1}{2}a^3 - a^2 = \frac{1}{2}a$	$\frac{4b^7c^5}{3}$	9
10	$a^3 . (-a) =$	$\frac{d^7}{d^6} =$	$\frac{-6a^9}{3a^3} =$		$-a^{3+1} = a^4$	$d^{7-6} = d$	$-2a^6$	10
11	$3z . z^6 =$	$\frac{m^3}{m^0} =$	$\frac{6a^2}{-14b^2c^6} =$		$3z^{1+6} = 3z^7$	$m^{3-0} = m^3$	$\frac{-3a^2}{7b^2c^6}$	11
12	$4b^8 . c^3 =$	$\frac{ac^2}{dc} =$	$\frac{6a^2c^7}{26b^6c^8} =$		$4b^8c^3$	$\frac{ac}{d}$	$\frac{-3a^2}{13b^6c}$	12
13	$a^8 . 13a^6 =$	$\frac{a^3}{a^6} =$	$\frac{6b^8}{b^2} =$		$13a^{8+6} = 13a^{14}$	$a^{3-6} = a^{-3} = \frac{1}{a^3}$	$6b^6$	13
14	$-8b^5 . b^3 =$	$\frac{2d^2}{4d^8} =$	$\frac{7a^2}{a^8c^9} =$		$-8b^{5+3} = -8b^8$	$\frac{1}{2}d^{2-8} = \frac{1}{2}d^{-6} = \frac{1}{2d^6}$	$\frac{7}{a^6c^9}$	14
15	$5ac^3 . a^7 =$	$\frac{z^3}{az^3} =$	$\frac{16b^3c^3}{b^3c^2} =$		$5a^{1+7}c^3 = 5a^8c^3$	$a^{0-1}z^{3-3} = a^{-1} = \frac{1}{a}$	$-16c$	15
16	$a^9c . c^4 =$	$\frac{4b^4}{2ab^2} =$	$\frac{b^2}{b5} =$		$a^9c^{1+4} = a^9c^5$	$2a^{0-1}b^{4-2} = 2a^{-1}b^2 = \frac{2b^2}{a}$	$\frac{1}{b^3}$	16
17	$5b^5c^8 . c =$	$\frac{5x^2}{10x^4} =$	$-\frac{11b^9c^4}{8a^2c^4} =$		$5b^5c^{8+1} = 5b^5c^9$	$\frac{1}{2}x^{2-4} = \frac{1}{2}x^{-2} = \frac{1}{2x^2}$	$\frac{-11b^9}{8a^2}$	17
18	$-6a . 3a^3 =$	$\frac{ay^2}{by} =$	$\frac{6a^3c^6}{-9b^6} =$		$-18a^{1+3} = -18a^4$	$ab^{0-1}y^{2-1} = ab^{-1}y = \frac{ay}{b}$	$\frac{-2a^3c^6}{3b^6}$	18
19	$a^2c^7 . b^4 =$	$\frac{x^6}{2ax^2} =$	$\frac{12b^4}{10b^6} =$		$a^2b^4c^7$	$\frac{1}{2}a^{0-1}x^{6-2} =$ $\frac{1}{2}a^{-1}x^4 = \frac{x^4}{2a}$	$\frac{6}{5b^2}$	19
20	$dc^8 . ab^2 =$	$\frac{2c^3}{c^2} =$	$\frac{b^3c^3}{4bc^5} =$		ab^2c^8d	$2c^{3-2} = 2c$	$\frac{b^2}{4c^2}$	20



niv.2 : puissance d'une puissance

Applique les propriétés des puissances.

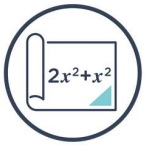
	colonne 1	colonne 2	colonne 3	colonne 1	colonne 2	colonne 3	
1	$(a^2)^6$ =	$(a^2)^{-3}$ =	a . $(a^3)^2$ =	$a^{2.6} = a^{12}$	$a^{2.-3} = a^{-6} = \frac{1}{a^6}$	a . $(a^3)^2$	1
2	$(a^2)^5$ =	$(d^2)^{-4}$ =	b . $(b^2)^{-3}$ =	$a^{2.5} = a^{10}$	$d^{2.(-4)} = d^{-8} = \frac{1}{d^8}$	$b^{1-6} = b^{-5} = \frac{1}{b^5}$	2
3	$(a^5)^5$ =	$(a^5)^{-2}$ =	c^2 . $(c^3)^4$ =	$a^{5.5} = a^{25}$	$a^{5.(-2)} = a^{-10} = \frac{1}{a^{10}}$	$c^{2+12} = c^{14}$	3
4	$(b^2)^3$ =	$(b^5)^2$ =	d^{-2} . $(a^2)^2$ =	$b^{2.3} = b^6$	$b^{5.2} = b^{10}$	d^{-2} . $a^4 = \frac{a^4}{d^2}$	4
5	$(x^4)^2$ =	$(z^2)^2$ =	z^{-3} . $(z^5)^{-6}$ =	$x^{4.2} = x^8$	$z^{2.2} = z^4 = \frac{1}{z^4}$	$z^{-3-30} = z^{-33} = \frac{1}{z^{33}}$	5
6	$(y^3)^5$ =	$(y^3)^{-2}$ =	$-2x^2$. $(2x^2)^2$ =	$y^{3.5} = y^{15}$	$y^{3.(-2)} = y^{-6} = \frac{1}{y^6}$	$-4x^{2+4} = -4x^6$	6
7	$(a^4)^5$ =	$(z^2)^{-5}$ =	$-a^5$. $(5a^5)^2$ =	$a^{4.5} = a^{20}$	$z^{2.(-5)} = z^{-10} = \frac{1}{z^{10}}$	$-6a^{5+10} = -6a^{15}$	7
8	$(y^3)^2$ =	$(b^2)^{-4}$ =	$(-3a^6)^2$. 3a =	$y^{3.2} = y^6$	$b^{2.(-4)} = b^{-8} = \frac{1}{b^8}$	$-9a^{12+1} = -9a^{13}$	8
9	$(-y^2)^4$ =	$(c^{-3})^4$ =	2a . $(-2a^3)^4$ =	$(-y)^{2.4} = y^8$	$c^{(-3).4} = c^{-12} = \frac{1}{c^{12}}$	$-4a^{12+1} = -4a^{13}$	9
10	$(c^2)^2$ =	$(d^0)^4$ =	$((-2a)^4)^5$. a^3 =	$c^{2.2} = c^4$	$d^{0.4} = d^0 = 1$	$-2a^{20+3} = -2a^{23}$	10
11	$(-a^3)^2$ =	$(-a^2)^{-9}$ =	$(-x^2)^5$.(-4x) =	$(-a)^{3.2} = a^6$	$(-a)^{2.(-4)} = (-a)^{-8} = \frac{1}{-a^8}$	$4x^{10+1} = 4x^{11}$	11
12	$(c^3)^6$ =	$(y^3)^4$ =	$-7b$. $(2b^3)^6$ =	$c^{3.6} = c^{18}$	$y^{3.4} = y^{12}$	$-14b^{1+18} = -14b^{19}$	12
13	$(y^5)^4$ =	$(y^2)^7$ =	$-4y^3$. $(4y^2)^7$ =	$y^{5.4} = y^{20}$	$y^{2.7} = y^{14}$	$-16y^{3+14} = -16y^{17}$	13
14	$(-a^2)^2$ =	$(z^4)^{-5}$ =	$(-a^2)^6$. a^3 =	$(-a)^{2.2} = a^4$	$z^{4.(-5)} = z^{-20} = \frac{1}{z^{20}}$	$-a^{12+3} = -a^{15}$	14
15	$(y^1)^9$ =	$(x^2)^{-1}$ =	$-x^5$. $(x^3)^9$ =	$y^{1.9} = y^9$	$x^{2.(-1)} = x^{-2} = \frac{1}{x^2}$	$-x^{5+27} = -x^{32}$	15
16	$(a^3)^3$ =	$(a^3)^{-4}$ =	$-3y$. $(-2y^2)^4$ =	$a^{3.3} = a^9$	$a^{3.(-4)} = a^{-12} = \frac{1}{a^{12}}$	$6y^{1+8} = 6y^9$	16
17	$(z^2)^5$ =	$(c^2)^8$ =	$-z^2$. z^3 . 2z =	$z^{2.5} = z^{10}$	$c^{2.8} = c^{16}$	$-2z^{2+3+1} = -2z^6$	17
18	$(b^4)^3$ =	$(d^2)^{-3}$ =	$3a^3$. $(-5a^2)^9$ =	$b^{4.3} = b^{12}$	$d^{2.(-3)} = d^{-6} = \frac{1}{d^6}$	$-15a^{3+18} = -15a^{21}$	18
19	$(a^7)^3$ =	$(b^2)^6$ =	$-2a$. $(-a^2)^{-4}$ =	$a^{7.3} = a^{21}$	$b^{2.6} = b^{12}$	$-2a^{1-8} = -2a^{-7} = \frac{1}{-2a^7}$	19
20	$(x^6)^2$ =	$(z^4)^{-7}$ =	$5b^3$. $(-5b^2)^4$ =	$x^{6.2} = x^{12}$	$z^{4.(-7)} = z^{-28} = \frac{1}{z^{28}}$	$-25^{3+8} = -25^{11}$	20



niv.3 : puissance d'un produit / quotient

Applique les propriétés des puissances.

	colonne 1	colonne 21	Indice col 1	sol col 1	Indice col 2	sol col 2	
1	$(3a)^2$ =	$\left(\frac{a}{3}\right)^3$ =	$3^2 . a^2$	$9a^2$	$\frac{a^3}{3^3}$	$\frac{a^3}{27}$	1
2	$(a . b)^2$ =	$\left(\frac{x}{b}\right)^2$ =	$a^2 . b^2$	a^2b^2	$\frac{x^2}{b^2}$	$\frac{x^2}{b^2}$	2
3	$(2x^2)^6$ =	$\left(\frac{a}{4}\right)^2$ =	$2^6 . (x^2)^6$	$64x^{12}$	$\frac{a^2}{4^2}$	$\frac{a^2}{16}$	3
4	$(5 . x)^2$ =	$\left(\frac{4a}{6}\right)^3$ =	$5^2 . x^2$	$25x^2$	$\frac{4^3a^3}{6^3}$	$\frac{8a^3}{27}$	4
5	$(-2 . y)^4$ =	$\left(\frac{-5y}{3}\right)^2$ =	$(-2)^4 . y^4$	$16y^4$	$\frac{(-5)^2y^2}{3^2}$	$\frac{25y^2}{9}$	5
6	$(3b^3)^2$ =	$\left(\frac{-a}{2}\right)^4$ =	$3^2 . (b^3)^2$	$9b^6$	$\frac{(-a)^4}{2^4}$	$\frac{a^4}{16}$	6
7	$(-10 . c)^2$ =	$\left(\frac{-x}{2}\right)^5$ =	$(-10)^2 . c^2$	$-100\ c^2$	$\frac{(-x)^5}{2^5}$	$\frac{-x^5}{32}$	7
8	$(5a)^3$ =	$\left(\frac{-3a}{2}\right)^3$ =	$5^3 . a^3$	$125a^3$	$\frac{(-3)^3a^3}{2^3}$	$\frac{-27a^3}{8}$	8
9	$(3 . a . b)^2$ =	$\left(\frac{5y}{3y}\right)^2$ =	$3^2 . a^2 . b^2$	$9a^2b^2$	$\frac{5^2y^2}{3^2y^2}$	$\frac{25}{9}$	9
10	$(-5 . a . c)^2$ =	$\left(\frac{2c}{4d}\right)^2$ =	$(-5)^2 . a^2 . c^2$	$25a^2c^2$	$\frac{2^2c^2}{4^2d^2}$	$\frac{c^2}{4d^2}$	10
11	$(xy)^3$ =	$\left(\frac{4a}{2a}\right)^2$ =	$x^3 . y^3$	x^3y^3	$\frac{4^2a^2}{2^2a^2}$	4	11
12	$(-4abc)^3$ =	$\left(\frac{4b}{5}\right)^3$ =	$(-4)^3 . a^3 . b^3 . c^3$	$-64a^3b^3c^3$	$\frac{4^3b^3}{5^3}$	$\frac{64b^3}{125}$	12
13	$(2ab)^4$ =	$\left(\frac{-2a}{6y}\right)^2$ =	$2^4 . a^4 . b^4$	$16a^4b^4$	$\frac{(-2)^2a^2}{6^2y^2}$	$\frac{a^2}{9y^2}$	13
14	$(a^2 . b^4)^2$ =	$\left(\frac{a}{2y}\right)^4$ =	$(a^2)^2 . (b^4)^2$	a^4b^8	$\frac{a^4}{2^4y^4}$	$\frac{a^4}{16y^4}$	14
15	$(a^3 . b)^4$ =	$\left(\frac{2c}{4}\right)^3$ =	$(a^3)^4 . b^4$	$a^{12}b^4$	$\frac{2^3c^3}{4^3}$	$\frac{c^3}{8}$	15
16	$(2 . a^3)^4$ =	$\left(\frac{2}{3b}\right)^3$ =	$2^4 . a^{12}$	$16a^{12}$	$\frac{2^3}{3^3b^3}$	$\frac{8}{27b^3}$	16
17	$(-3 . a^2)^2$ =	$\left(\frac{8}{3x}\right)^2$ =	$(-3^2)^2 . (a^2)^2$	$81a^4$	$\frac{8^2}{3^2x^2}$	$\frac{64}{9x^2}$	17
18	$(a^3b)^3$ =	$\left(\frac{-2}{4a}\right)^3$ =	$(a^3)^3 . b^3$	a^9b^3	$\frac{(-2)^3}{4^3a^3}$	$\frac{-1}{8a^3}$	18
19	$(3ab^2)^3$ =	$\left(\frac{a}{3b}\right)^4$ =	$3^3 . a^3 . (b^2)^3$	$27a^3b^6$	$\frac{a^4}{3^4b^4}$	$\frac{a^4}{81b^4}$	19
20	$(-5a^2b^3)^3$ =	$\left(\frac{-a}{7}\right)^2$ =	$(-5)^3 . (a^2)^3 . (b^3)^3$	$-125a^6b^9$	$\frac{(-a)^2}{7^2}$	$\frac{a^2}{49}$	20



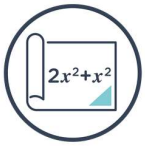
niv.4 : mélange de puissances

Applique les propriétés des puissances.

	colonne 1	colonne 2	col1	col2	
1	$5a^4 . 3a^2 =$	$(3b^3)^2 =$	$15a^6$	$9b^6$	1
2	$(y^3)^8 =$	$\left(\frac{-2a}{6y}\right)^2 =$	y^{24}	$\frac{a^2}{9y^2}$	2
3	$-4y^5 . (4y^2)^2 =$	$-2a . (-a^2)^{-4} =$	$-64y^9$	$2a^{-7} = \frac{2}{a^7}$	3
4	$-2b . (-b^2)^{-4} =$	$(z^4)^{-5} =$	$-2b^{-7} = \frac{-2}{b^7}$	$z^{-20} = \frac{1}{z^{20}}$	4
5	$a^7 . 13a^6 =$	$-7b . (2b^3)^2 =$	$13a^{13}$	$-28b^7$	5
6	$(-a^2)^2 =$	$-2a . (-5a^8) =$	a^43^3	$10a^9$	6
7	$5x^3 . (-5x^2)^2 =$	$a^9 . c^2 . b^5 =$	$125x^7$	$a^9 . b^5 . c^2$	7
8	$(-a^2)^{-9} =$	$a . (a^3)^2 =$	$-a^{18}$	a^7	8
9	$\frac{3a^3}{6a^2} =$	$\frac{ay^2}{by} =$	$\frac{a}{2}$	$\frac{ay}{b}$	9
10	$4a^7 . y =$	$a^9c . c^4 =$	$4a^7y$	a^9c^5	10
11	$\frac{4y^6}{2ay^2} =$	$(-3 . a^2)^2 =$	$\frac{2y^4}{a}$	$9a^4$	11
12	$-a^5 . (a^3)^9 =$	$((-2a)^3)^2 . a^3 =$	a^{27}	$64a^9$	12
13	$c^5 . c^2 =$	$(a^2 . b^4)^2 =$	c^7	a^4b^8	13
14	$(2ax)^4 =$	$\left(\frac{4b}{5}\right)^3 =$	$16a^4x^4$	$\frac{64b^3}{125}$	14
15	$5ac^3 . a^7 =$	$z^{-3} . (z^5)^{-6} =$	$5a^8c^3$	$z^{-33} = \frac{1}{z^{33}}$	15
16	$\left(\frac{-3a}{2}\right)^3 =$	$(d^2)^{-3} =$	$\frac{-27a^3}{8}$	$d^{-6} = \frac{1}{d^{-6}}$	16
17	$(-2 . y)^4 =$	$(a . b)^2 =$	$16y^4$	a^2b^2	17
18	$(-5y . 2a . z)^2 =$	$(-5a^2b^3)^3 =$	$100a^2y^2z^2$	$-125a^6b^9$	18
19	$(b^2 . c^4)^2 =$	$(xy)^3 =$	b^4c^8	x^3y^3	19
20	$-6z . 3a^3 =$	$4b^8 . c^3 =$	$-18a^3z$	$4b^8c^3$	20

module V

priorité des opérations algébriques



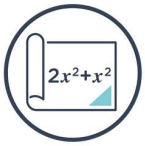
niv.1 : 4 opérations

Applique les priorités des opérations.

	énoncé	indice	solution	
1	4x . 4 + 3 - 3 =	4x . 4 + 3 - 3	16x	1
2	4 + 20x² . 4x =	4 + 20x² . 4x	80x³ + 4	2
3	2 + 3x . 2y - 3 =	2 + 3x . 2y - 3	6xy - 1	3
4	6 + 6 - 2 . 4z =	6 + 6 - 2 . 4z	-8z + 12	4
5	4 + 12 . 3 . 4b =	4 + 12 . 3 . 4b	144 b + 4	5
6	10x + 8x - 4 . 4y =	10x + 8x - 4 . 4y	18x - 16y	6
7	5 + 3xz . 3 - 2 =	5 + 3xz . 3 - 2	9xz + 3	7
8	10a + 8b - 3a .4a =	10a + 8b - 3a . 4a	-12a² + 10a + 8b	8
9	8x . 2y - 4 =	8x . 2y - 4	16xy - 4	9
10	12b . 3x - 4x =	12b . 3x - 4x	36bx - 4x	10
11	13b + 2c. 4 =	13 b+ 2c . 4	13b + 8c	11
12	15z - 5z + 4x . 4z =	15z - 5z + 4x . 4z	16xz - 10z	12
13	12a . 3 - 5a =	12a . 3 - 5a	31a	13
14	6c . 4c - 6c =	6c . 4c - 6c	24c² - 6c	14
15	13a - 2b . 2a =	13a - 2b . 2a	13a - 4ab	15
16	21b - 7c . 3a =	21b - 7c . 3a	-21ab + 21b	16
17	40r . 4i + 10z - 5z =	40r . 4i . (10z - 5z)	800riz	17
18	13x . 3x - 8x =	13x . 3x - 8x	39x² - 8x	18
19	20x - 5z + 4z . 7x =	20x - 5z + 4z . 7x	20x + 28xz - 5z	19
20	3 + 5y - 5 . 7x =	3 + 5y - 5 . 7x	-35x + 5y +3	20

module V

priorité des opérations algébriques



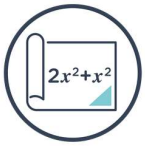
niv.2 : 4 opérations et parenthèses

Applique les priorités des opérations.

	énoncé	indice	solution	
1	2a . 4b - 2ab . 2 =	2a . 4b - 2ab . 2	4ab	1
2	12x - 10x + 2 . 4x =	12x - 10x + 2 . 4x	10x	2
3	(4ab + 7ab -2a . 2b) . 2a =	(4ab + 7ab -2a . 2b) . 2a	$14a^2b$	3
4	a +b + ab - (a - b - 2a . 3b) =	a + b + ab - (a - b - 2a . 3b)	2b+ 7ab	4
5	5 . (2a . 5b - 3b) =	5 . (2a . 5b - 3b)	50ab - 15b	5
6	3x . 5y . (3x - 5y) =	3x . 5y . (3x - 5y)	$45x^2y - 75xy^2$	6
7	4b . (10a + 13a - 18a) =	4b . (10a + 13a - 18a)	20ab	7
8	24ax - (10 ax + 3a - 8ax) =	24ax - (10 ax + 3a - 8ax)	22ax - 3a	8
9	x + x . x =	x + x . x	$x^2 + x$	9
10	$4x - 3 . 12x^2 - 4x^2$ =	$4x - 3 . 12x^2 - 4x^2$	$4x - 40x^2$	10
11	5ay . 2x - 4ax . 2xy =	5ay . 2x - 4ax . 2xy	$10axy - 8ax^2y$	11
12	$3x + 6y^2 - 4x . 6$ =	$3x + 6y^2 - 4x . 6$	$-21x + 6y^2$	12
13	12x - 12x . 2y - 12 =	12x - 12x . 2y - 12	12x - 24xy - 12	13
14	$7x - 4x^2 . 3$ =	$7x - 4x^2 . 3$	$-12 x^2 + 7x$	14
15	$25x^2 - 11xy . 10x + 2y$ =	$25x^2 - 11xy . 10x + 2y$	$25x^2 - 110x^2y + 2y$	15
16	14ay - (25ay - 3a . 5y) =	14ay - (25ay - 3a . 5y)	4ay	16
17	-10x -(2c + 3c . 15a +(-2)) =	-10x -(2c + 3c . 15a +(-2))	-10x - 2c - 45 ac + 2	17
18	$3x^2 . (2x -(4c + 5c).3x)$ =	$3x^2 . (2x -(4c + 5c).3x)$	$6x^3 - 81cx^3$	18
19	5x - (3. 4x -2). 6y =	5x - (3. 4x -2). 6y	5x - 72xy + 12y	19
20	6ax - 7bx. 3 - 4ax =	6ax - 7bx. 3 - 4ax	2ax - 21bx	20

module V

priorité des opérations algébriques



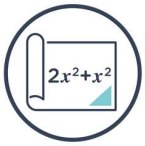
niv.2 : 4 opérations et parenthèses

Applique les priorités des opérations.

	énoncé	indice	solution	
21	19 cd + 3c . (4d - 5) =	19cd + 3c . (4d - 5)	31cd -15c	21
22	2a . (3c - d) - 4ac =	2a . (3c - d) - 4ac	2ac - 2ad	22
23	(4a + b - 3a - b). 5b =	(4a + b - 3a - b). 5b	5ab	23
24	3c . 4a - 5ac . 0 + 5ac =	3c . 4a - 5ac . 0 + 5ac	17ac	24
25	4b - 3 . 6x . 2y - 2y =	4b - 3 . 6x . 2y - 2y	4b - 36xy - 2y	25
26	(4av . 3 - 2a . 4v) . 2 =	(4av . 3 - 2a . 4v) . 2	8av	26
27	10b . 4c + 0 - 4c .2b =	10b . 4c + 0 - 4c .2b	32bc	27
28	11y- 5x.(2x - 3y) - 11y =	11y- 5x. (2x - 3y) - 11y	$-10x^2 + 15xy$	28
29	-2x . (14y - 5z) =	-2x . (14y - 5z)	-28xy + 10xz	29
30	25d - 12d + 3a . (2d - 1) =	25d - 12d + 3a . (2d - 1)	13d + 10ad + 3	30
31	14x - 5xy +3x . (2xy -5) =	14x - 5xy +3x . (2xy -5)	$-x - 5xy + 6x^2y$	31
32	10x . 3 - 3x.(7y - 4) =	10x . 3 - 3x. (7y - 4)	42x - 21xy	32
33	-12 - 6. (2xy - 7y) =	-12 - 6. (2xy - 7y)	-12 - 12xy + 42y	33
34	-(6 - 7). 3x - 5y =	-(6 - 7). 3x - 5y	3x - 5y	34
35	5x - 6c . 8b - 8b =	5x - 6c . 8b - 8b	5x - 48bc - 8b	35
36	(3x - 5y) . 4x + 4 =	(3x - 5y) . 4x + 4	$12x^2 - 20xy + 4$	36
37	7 - 10z . (3y - 4z) =	7 - 10z . (3y - 4z)	$7 - 30yz + 40z^2$	37
38	$13 - 9x .(543 - 534 - 7) + 15x^2$ =	$13 - 9x .(543 - 534 - 7) + 15x^2$	$15x^2 - 18x + 13$	38
39	$-5x^2 . (8x - 4y) - 20x^3$ =	$-5x^2 . (8x - 4y) - 20x^3$	$-60x^3 + 20x^2y$	39
40	$-2a . 4c . (- 2b) . (- 3c) + 15 c^2$ =	$-2a . 4c . (- 2b) . (- 3c) + 15 c^2$	$-48abc^2 + 15c^2$	40

module V

priorité des opérations algébriques



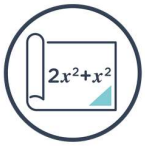
niv.3 : 4 opérations, parenthèses et exposants

Applique les priorités des opérations.

	énoncé	solution	
1	$x^2 + (x+y)^2 + y^2 =$	$2x^2 + 2xy + 2y^2$	1
2	$(-2a^2x^3)^3 + 4a^4x^2 \cdot (3a^2x^7 - 1) =$	$4a^6x^9 - 4a^4x^2$	2
3	$(9x^4 + 1) - (-3x^2)^2 =$	1	3
4	$[5c - (-6c)]^2 + 4c \cdot (-2c) =$	$113c^2$	4
5	$(-5xy)(3x^2y)^2 - 3x^2y \cdot (-2x^3y^2) =$	$-39x^5y^3$	5
6	$(c^2 + 1)^2 - (-5c^2 - 2) =$	$c^4 + 7c^2 + 3$	6
7	$-(-3id) - (2i - d)^2 =$	$-4i^2 - d^2 + 7id$	7
8	$(3x - 5y) \cdot 4x + 6 =$	$12x^2 - 20xy + 6$	8
9	$10x \cdot 3 - 6x.(7y - 4) =$	$54x - 42xy$	9
10	$6ac - 7bc. 3 - 4ac =$	$2ac - 21bc$	10
11	$-25 - 6. (2ab - 8c) =$	$-25 - 12ab + 48c$	11
12	$m^2 + (m+n)^2 + n^2 =$	$2m^2 + 2mn + 2n^2$	12
13	$4z - 3 \cdot 6x \cdot 2y - 2y =$	$- 36xy - 2y + 4z$	13
14	$3x^2 \cdot (2x - (4c + 5c).3x) =$	$6x^3 - 81cx^3$	14
15	$-(-3bc) - (2b - c)^2 =$	$-4b^2 - c^2 + 7bc$	15
16	$(9y^4 + 1) - (-3y^2)^2 =$	1	16
17	$(3a - 5b) \cdot 4a + 8 =$	$12a^2 - 20ab + 8$	17
18	$9 - 10x \cdot (3y - 4x) =$	$40x^2 - 30xy + 9$	18
19	$[4b - (-6b)]^2 + 5b \cdot (-2b) =$	$90b^2$	19
20	$-(-2ab) - (2a - b)^2 =$	$-4b^2 + 6ab - b^2$	20

module VI

distributivité simple et mise en évidence



niv.1 : sans puissance

Applique la simple distributivité ou la mise en évidence.

	distribue	mets en évidence		Distributivité	mise en évidence	
1	x . (2y + 3) =	4x + 4 =		2xy + 3x	4 . (x +1)	1
2	(3 + y) . 2x =	2ab + 2ac =		6x + 2xy	2a . (b + c)	2
3	7 . (3a + 2) =	8b + 4a =		21a + 14	4 . (2b + a)	3
4	2a . (3b + 3) =	a + ab =		6ab + 6a	a . (1 + b)	4
5	3 . (2b + 5) =	x . 2y + z . 2y =		6b + 15	2y . (x + z)	5
6	5 . (2x + 3y) =	2xz + 2yz =		10x + 15y	2z . (x + y)	6
7	x . (2y + 3) =	6a + 12b =		2xy + 3x	6 . (a + 2b)	7
8	3a . (2c + 3d) =	24x + 36 xy =		6ac + 9ad	12x .(2 + 3y)	8
9	(5a + 3) . 2 =	50xy + 75 xz =		10a + 6	25x . (2y + 3z)	9
10	3 . (2x + 2) =	9ab + 3a =		6x + 6	3a . (3b + 1)	10
11	(b + 2) . a =	9a + 6c =		ab + 2a	3 .(3a + 2c)	11
12	3 . (2a + 3b) =	16b + 8 =		6a + 9b	8 . (2b + 1)	12
13	8 . (2x + 3y) =	9ax + 6ay =		16x + 24y	3a. (3x +2y)	13
14	4a . (3b + 4c) =	12xy + 4x =		12ab + 12ac	4x . (3y +1)	14
15	5 . (3x + 4y) =	14x + 21 =		15x + 20y	7 . (2x + 3)	15
16	15b . (2a + 3c) =	5ab + 6bc =		30ab + 45 bc	b . (5a + 6c)	16
17	3 . (x + y) =	8xy + 6yz =		3x + 3y	2y . (4x + 3z)	17
18	5a . (1 + c) =	16x + 24y =		5a + 5ac	8 . (2x +3y)	18
19	5 . (a + d) =	5ax + 15ab =		5a + 5d	5a. (x + 3b)	19
20	6 . (3a + 4c) =	30c + 10x =		18a + 24c	10. (3c +x)	20

module VI

distributivité simple et mise en évidence

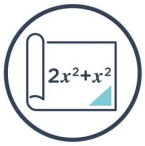
niv.1 : sans puissance

Applique la simple distributivité ou la mise en évidence.

	distribuer	mettre en évidence		distribuer	mettre en évidence	
21	8f . (7e + 1) =	36x + 20xy =		56ef + 8f	4x . (9 + 5y)	21
22	6y . (4 + x) =	48xy + 6y =		24y + 6xy	6y . (8x + 1)	22
23	6 . (8a + 5b) =	12b - 21ab =		48a + 30b	3b . (4 - 7a)	23
24	5n . (m + 8) =	10f + 15ef =		5mn + 40n	5f . (2 + 3e)	24
25	3a . (b - 2) =	27 + 12e =		3ab - 6a	3 . (9 + 4e)	25
26	7b . (8a - 1) =	12ab + 4b =		56ab - 7b	4b . (3a + 1)	26
27	9n . (4m + 7) =	7f + 7 =		36mn + 63n	7 . (f + 1)	27
28	8y . (x + 1) =	27xy + 12y =		8xy + 8y	3y . (9x + 4)	28
29	6y . (4x + 7) =	25b - 35ab =		24xy + 42y	5b . (5 - 7a)	29
30	b . (1 + 2a) =	12b + 28ab =		b + 2ab	4b . (3 + 7a)	30
31	4 . (ef + 5) =	18ab - 8a =		4ef + 20	2a . (9b - 4)	31
32	4m . (2 - 7n) =	27n + 18mn =		8m - 28mn	9n . (3 + 2m)	32
33	8 . (4 + 3a) =	24a + 15ab =		32 + 24a	3a . (8 + 5b)	33
34	8n . (9 - 2m) =	24f - 4ef =		72n - 16mn	4f . (6 - e)	34
35	7b . (9a + 1) =	36xy - 4y =		63ab + 7b	4y . (9x - 1)	35
36	4y . (5 - 9x) =	3f - 7ef =		20y - 36xy	f . (3 - 7e)	36
37	8n . (8m + 7) =	64y + 40x =		64mn + 56n	8 . (8y + 5x)	37
38	9b . (5 + 6a) =	63y + 54xy =		45b + 54ab	9y . (7 + 6x)	38
39	f . (2e + 7) =	25e + 5 =		2ef + 7f	5 . (5e + 1)	39
40	f . (9 + e) =	36n - 4 =		9f + ef	4 . (9n - 1)	40

module VI

distributivité simple et mise en évidence



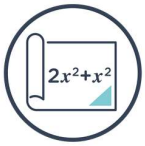
niv.1 : sans puissance

Applique la simple distributivité ou la mise en évidence.

	distributivité	mise en évidence		distributivité	mise en évidence	
41	9b . (a + 1) =	12f + 16e =		9ab + 9b	4 . (3f + 4e)	41
42	9e . (3f + 1) =	8x + 36xy =		27ef + 9e	4x . (2 + 9y)	42
43	1 . (5 - 9x) =	5x - 7y =		5 - 9x	1 . (5x - 7y)	43
44	2n . (9 + 2m) =	15mn + 21n =		18n + 4mn	3n . (5m + 7)	44
45	3 . (1 - 3mn) =	28xy + 35x =		3 - 9mn	7x . (4y + 5)	45
46	2x . (4 + 9y) =	7mn + 5n =		8x + 18xy	n . (7m + 5)	46
47	2a . (b + 3) =	6b + 10ab =		2ab + 6a	2b . (3 + 5a)	47
48	2y . (9x + 7) =	24e + 21 =		18xy + 14y	3 . (8e + 7)	48
49	7n . (7m + 2) =	36xy - 8x =		49mn + 14n	4x . (9y - 2)	49
50	9e . (1 + 8f) =	18ef + 81f =		9e + 72ef	9f . (2e + 9)	50
51	n . (m + 3) =	12b - 9ab =		mn + 3n	3b . (4 - 3a)	51
52	4 . (9xy + 5) =	3mn + 7m =		36xy + 20	m . (3n + 7)	52
53	8a . (3 + 4b) =	48a + 8b =		24a + 32ab	8 . (6a + b)	53
54	3n . (8m + 7) =	6ef + 6 =		24mn + 21n	6 . (ef + 1)	54
55	2m . (7 + 4n) =	40f + 45ef =		14m + 8mn	5f . (8 + 9e)	55
56	8f . (5 + e) =	6f - 9e =		40f + 8ef	3 . (2f - 3e)	56
57	3x . (7y + 3) =	35xy + 7y =		21xy + 9x	7y . (5x + 1)	57
58	6a . (b - 1) =	63y + 36 =		6ab - 6a	9 . (7y + 4)	58
59	5n . (9m + 1) =	7mn + 42m =		45mn + 5n	7m . (n + 6)	59
60	3b . (4a - 3) =	4f + 10ef =		12ab - 9b	2f . (2 + 5e)	60

module VI

distributivité simple et mise en évidence



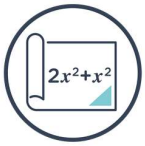
niv.1 : sans puissance

Applique la simple distributivité ou la mise en évidence.

	distributivité	mise en évidence		distributivité	mise en évidence	
61	3y . (6x + 5) =	20x + 36xy =		18xy + 15y	4x . (5 + 9y)	61
62	5 . (4 + n) =	42b + 24ab =		20 + 5n	6b . (7 + 4a)	62
63	7f . (2 + 3e) =	20 + 16ef =		14f + 21ef	4 . (5 + 4ef)	63
64	n . (7m + 8) =	21xy + 6y =		7mn + 8n	3y . (7x + 2)	64
65	4 . (9 - 4y) =	9a - 54ab =		36 - 16y	9a . (1 - 6b)	65
66	5n . (5 - 7m) =	45 - 40n =		25n - 35mn	5 . (9 - 8n)	66
67	6n . (5m - 9) =	28mn - 24n =		30mn - 54n	4n . (7m - 6)	67
68	8n . (4 - 7m) =	18xy + 81x =		32n - 56mn	9x . (2y + 9)	68
69	2a . (5b + 1) =	3x + 8y =		10ab + 2a	1 . (3x + 8y)	69
70	6a . (5b + 7) =	4xy + x =		30ab + 42a	x . (4y + 1)	70
71	4 . (7b + 9) =	16m + 8mn =		28b + 36	8m . (2 + n)	71
72	4a . (3b - 8) =	12xy - 30y =		12ab - 32a	6y . (2x - 5)	72
73	7e . (7 - 3f) =	35ab + 5a =		49e - 21ef	5a . (7b + 1)	73
74	5e . (f + 9) =	8ef - 10e =		5ef + 45e	2e . (4f - 5)	74
75	4m . (5 + 3n) =	49ef + 42e =		20m + 12mn	7e . (7f + 6)	75
76	2b . (2 - 7a) =	6xy - 27y =		4b - 14ab	3y . (2x - 9)	76
77	5b . (5a + 7) =	7e + 42ef =		25ab + 35b	7e . (1 + 6f)	77
78	b . (a - 3) =	24m + 16n =		ab - 3b	8 . (3m + 2n)	78
79	3y . (7x - 2) =	8n + 28mn =		21xy - 6y	4n . (2 + 7m)	79
80	2x . (5y - 9) =	8y + 6xy =		10xy - 18x	2y . (4 + 3x)	80

module VI

distributivité simple et mise en évidence



niv.1 : sans puissance

Applique la simple distributivité ou la mise en évidence.

	distributivité	mise en évidence		col1	col2	
81	8 . (3 - 5ab) =	27xy + 9x =		24 - 40ab	9x . (3y + 1)	81
82	2x . (8y + 9) =	9a + 7b =		16xy + 18x	1 . (9a + 7b)	82
83	2 . (7n - 8m) =	8ab - 8a =		14n - 16m	8a . (b - 1)	83
84	8m . (3n - 1) =	7mn + 14n =		24mn - 8m	7n . (m + 2)	84
85	8e . (3f + 2) =	48ab + 30 =		24ef + 16e	6 . (8ab + 5)	85
86	6y . (5 - 3x) =	9a - 3b =		30y - 18xy	3 . (3a - b)	86
87	6e . (f + 1) =	49ef + 7 =		6ef + 6e	7 . (7ef + 1)	87
88	6y . (x - 8) =	8mn + 16n =		6xy - 48y	8n . (m + 2)	88
89	y . (5x + 4) =	6 + 9x =		5xy + 4y	3 . (2 + 3x)	89
90	9f . (9 + e) =	56 + 32m =		81f + 9ef	8 . (7 + 4m)	90
91	4e . (8 + f) =	28x + 7xy =		32e + 4ef	7x . (4 + y)	91
92	6e . (9 + 2f) =	18x + 12xy =		54e + 12ef	6x . (3 + 2y)	92
93	2 . (4y - 1) =	35y + 25xy =		8y - 2	5y . (7 + 5x)	93
94	9 . (4x - 1) =	49y + 42xy =		36x - 9	7y . (7 + 6x)	94
95	a . (7b + 3) =	56b - 16ab =		7ab + 3a	8b . (7 - 2a)	95
96	3b . (3a + 8) =	4n - 2 =		9ab + 24b	2 . (2n - 1)	96
97	2a . (6b - 7) =	18m + 3mn =		12ab - 14a	3m . (6 + n)	97
98	3b . (8 + 3a) =	36mn + 4n =		24b + 9ab	4n . (9m + 1)	98
99	b . (4a - 7) =	35xy + 49y =		4ab - 7b	7y . (5x + 7)	99
100	6 . (8 + n) =	f + 4ef =		48 + 6n	f . (1 + 4e)	100

module VI

distributivité simple et mise en évidence

niv.2 : avec puissance

Applique la simple distributivité ou la mise en évidence

	distribue	mets en évidence		distributivité	mise en évidence	
1	$-10d \cdot (d - 2) =$	$7a^{10}b^6 + 4a^5b^2c =$		$-10d^2 + 20d$	$a^5b^2 \cdot (7a^5b^4 + 4c)$	1
2	$-3x^2 - (7b^2 + 2) =$	$16e^8f^7g + 4e^5f^3 =$		$21x^2b^2 + 6x^2$	$4e^5f^3 \cdot (4e^3f^4g + 1)$	2
3	$2b \cdot (3b + c) =$	$7e^5f^6 + 5e^4f^3 =$		$6b^2 + 2bc$	$e^4f^3 \cdot (7ef^3 + 5)$	3
4	$2a \cdot (a + 3) =$	$2y^3z^3 - 9x^3y^5z^3 =$		$2a^2 + 6a$	$y^3z^3 \cdot (2 - 9x^3y^2)$	4
5	$(3b + 2) \cdot 2b =$	$45m^3n^3 + 81m^8n^6 =$		$6b^2 + 4b$	$9m^3n^3 \cdot (5 + 9m^5n^3)$	5
6	$(5x + 2y) \cdot 4x =$	$4m^5n^5p^4 + 24m^3p^4 =$		$20x^2 + 8xy$	$4m^3p^4 \cdot (m^2n^5 + 6)$	6
7	$x \cdot (x + 2) =$	$8m^3n^8p + 12m^7n^3 =$		$x^2 + 2x$	$4m^3n^3 \cdot (2n^5p + 3m^4)$	7
8	$b \cdot (-b + 3c) =$	$48m^3n^6 + 30mnp^3 =$		$-b^2 + 3cb$	$6mn \cdot (8m^2n^5 + 5p^3)$	8
9	$-4x \cdot (3c - 5x) =$	$54m^6p^3 + 9mnp^7 =$		$20x^2 - 12xc$	$9mp^3 \cdot (6m^5 + np^4)$	9
10	$6b \cdot (1 - b) =$	$7e^5g^4 - 56e^8f^4g^7 =$		$6b - 6b^2$	$7e^5g^4 \cdot (1 - 8e^3f^4g^3)$	10
11	$-4a \cdot (2a + 3c) =$	$9f^3 + 54e^3f^3 =$		$-8a^2 - 12ac$	$9f^3 \cdot (1 + 6e^3)$	11
12	$3f \cdot (2 - 3e^2f^2) =$	$63m^8n^5p + 9m^5n^3 =$		$6f - 9e^2f^3$	$9m^5n^3 \cdot (7m^3n^2p + 1)$	12
13	$2 \cdot (5 - 4a^2b^2) =$	$54a^4b^8 + 30a^8b^5c^5 =$		$10 - 8a^2b^2$	$6a^4b^5 \cdot (9b^3 + 5a^4c^5)$	13
14	$9ef \cdot (8e + 9f^2) =$	$64e^3f^2 - 40e^6f^5 =$		$72e^2f + 81ef^3$	$8e^3f^2 \cdot (8 - 5e^3f^3)$	14
15	$6n \cdot (5m^2n^2 + 9) =$	$12e^6f^3 - 2e^2f^4g^4 =$		$30m^2n^3 + 54n$	$2e^2f^3 \cdot (6e^4 - fg^4)$	15
16	$2m^2n \cdot (4m^2n^2 + 1) =$	$49bc^6 + 14a^3b^3c^4 =$		$8m^4n^3 + 2m^2n$	$7bc^4 \cdot (7c^2 + 2a^3b^2)$	16
17	$8ab \cdot (3a + 7b^2) =$	$27x^3z^4 + 36x^6y^4z^9 =$		$24a^2b + 56ab^3$	$9x^3z^4 \cdot (3 + 4x^3y^4z^5)$	17
18	$8c \cdot (-2c - 3a) =$	$8m^2n^2p^4 + 28m^5p^7 =$		$-16c^2 - 24ac$	$4m^2p^4 \cdot (2n^2 + 7m^3p^3)$	18
19	$3m \cdot (6 - 7m^2) =$	$49e^2g^4 + 28e^3fg^6 =$		$18m - 21m^3$	$7e^2g^4 \cdot (7 + 4efg^2)$	19
20	$9xy^2 \cdot (8x^2y + 1) =$	$32y^4z^4 + 24x^5y^5z^7 =$		$7x^3y^3 + 9xy^2$	$8y^4z^4 \cdot (4 + 3x^5yz^3)$	20

module VI

distributivité simple et mise en évidence

niv.2 : avec puissance

Applique la simple distributivité ou la mise en évidence

	distribue	mets en évidence		distributivité	mise en évidence	
21	$9m^2n^2 . (5n + 8) =$	$40n^2p^2 + 32m^5n^4p^4 =$		$45m^2n^3 + 72m^2n^2$	$8n^2p^2 . (5 + 4m^5n^2p^2)$	21
22	$4f . (5 - 7ef) =$	$48x^9y^2z^8 + 6x^5z^4 =$		$20f - 28ef^2$	$6x^5z^4 . (8x^4y^2z^4 + 1)$	22
23	$1 . (5y - 8x) =$	$6ef - 4e^6f^6g^5 =$		$5y - 8x$	$2ef . (3 - 2e^5f^5g^5)$	23
24	$4m^2n^2 . (3mn^2 + 4) =$	$45e^2f^3g^3 + 20g^5 =$		$12m^3n^4 + 16m^2n^2$	$5g^3 . (9e^2f^3 + 4g^2)$	24
25	$9b^2 . (7b^2 + 8a) =$	$63x^2a^3 + 54a^2 =$		$63b^4 + 72ab^2$	$9a^2 . (7x^2a + 6)$	25
26	$8ef . (2e^2f^2 - 9) =$	$64yz^3 + 16y^2z^4 =$		$16e^3f^3 - 72ef$	$8yz^3 . (8 + 2yz)$	26
27	$3b . (5a^2 - 7) =$	$25ab^4 + 10a^2b^2 =$		$15a^2b - 21b$	$5ab^2 . (5b^2 + 2a)$	27
28	$7n^2 . (6mn^2 - 1) =$	$13cd^5 + 39xd^4 =$		$42mn^4 - 7n^2$	$13d^4 . (cd + 3dx)$	28
29	$9a^2b^2 . (5 + 8b^2) =$	$14a^2c^3 + 21a^3c =$		$45a^2b^2 + 72a^2b^4$	$7a^2c . (2c^2 + 3ac)$	29
30	$4y^2 . (6y^2 - x) =$	$2ab^3 + 8a^2b^4 =$		$24y^4 - 4xy^2$	$2ab^3 . (1 + 4ab)$	30
31	$4mn . (5 + 4mn^2) =$	$25a^7bc^4 + 5a^5c =$		$20mn + 16m^2n^3$	$5a^5c . (5a^2bc^3 + 1)$	31
32	$3bc . (6 + 2ac) =$	$7x^9y^5z^4 - 42x^5z^3 =$		$18bc + 6abc^2$	$7x^5z^3 . (x^4y^5z - 6)$	32
33	$5y^2 . (xy^2 + 2) =$	$5y^5z^4 + 15x^2y^9z^9 =$		$5xy^4 + 10y^2$	$5y^5z^4 . (1 + 3x^2y^4z^5)$	33
34	$9e . (3f^2 + 8e^2) =$	$16b^2c^6 + 20a^3b^4c^5 =$		$27ef^2 + 72e^3$	$4b^2c^5 . (4c + 5a^3b^2)$	34
35	$9xy^2 . (2y^2 + 1) =$	$10a^8c^4 + 5a^3c^2 =$		$18xy^4 + 9xy^2$	$5a^3c^2 . (2a^5c^2 + 1)$	35
36	$4ay^2 . (2b - 4) =$	$63a^{10}b^4c^4 - 35a^5b^8 =$		$8aby^2 - 16ay^2$	$7a^5b^4 . (9a^5c^4 - 5b^4)$	36
37	$9m^2n^2 . (5m^2n + 8) =$	$27abc^2 + 24a^6c^7 =$		$45m^4n^3 + 72m^2n^2$	$3ac^2 . (9b + 8a^5c^5)$	37
38	$4a^2 . (3 + 8b^2) =$	$9x^5y^9z^8 + 3y^5z^5 =$		$12a^2 + 32a^2b^4$	$3y^5z^5 . (3x^5y^4z^3 + 1)$	38
39	$a^2b^2 . (7b^2 + a^2) =$	$x^{10}z^5 + 4x^5y^5z^{10} =$		$7a^2b^4 + a^4b^2$	$x^5z^5 . (x^5 + 4y^5z^5)$	39
40	$5 . (3 - m) =$	$8a^2 + 24a^3b^2 =$		$15 - 5m$	$8a^2 . (1 + 3ab^2)$	40

module VII

niv.1 : Jusqu'au deuxième degré

Applique la double distributivité.

	colonne 1	colonne 2		col1	col2	
1	(x + 3) (x + 6) =	(x + 9) (x + 9) =		$x^2 + 9x + 18$	$x^2 + 18x + 81$	1
2	(x + 3) (x + 2) =	(x - 8) (x - 1) =		$x^2 + 5x + 6$	$x^2 - 9x + 8$	2
3	(x + 4) (x + 3) =	(x - 4) (x + 5) =		$x^2 + 7x + 12$	$x^2 + x - 20$	3
4	(x - 2) (x - 2) =	(x + 1) (x + 5) =		$x^2 - 4x + 4$	$x^2 + 6x + 5$	4
5	(x + 6) (x + 2) =	(x + 2) (x - 2) =		$x^2 + 8x + 12$	$x^2 - 4$	5
6	(x + 10) (x - 9) =	(x + 4) (x + 8) =		$x^2 + x - 90$	$x^2 + 12x + 32$	6
7	(x - 7) (x + 7) =	(x + 3) (x + 7) =		$x^2 - 49$	$x^2 + 10x + 21$	7
8	(x - 1) (x - 3) =	(x + 4) (x + 1) =		$x^2 - 4x + 3$	$x^2 + 5x + 4$	8
9	(x + 3) (x + 2) =	(x - 8) (x + 6) =		$x^2 + 5x + 6$	$x^2 - 2x - 48$	9
10	(x - 2) (x - 2) =	(x + 9) (x - 3) =		$x^2 - 4x + 4$	$x^2 + 6x - 27$	10
11	(x + 8) (x + 1) =	(x - 3) (x - 7) =		$x^2 + 9x + 8$	$x^2 - 10x + 21$	11
12	(x - 6) (x - 9) =	(x - 2) (x + 1) =		$x^2 - 15x + 54$	$x^2 - x - 2$	12
13	(x + 6) (x + 2) =	(x - 8) (x + 9) =		$x^2 + 8x + 12$	$x^2 + x - 72$	13
14	(x + 2) (x + 7) =	(x - 6) (x + 7) =		$x^2 + 9x + 14$	$x^2 + x - 42$	14
15	(x - 4) (x + 1) =	(x - 7) (x + 7) =		$x^2 - 3x - 4$	$x^2 - 49$	15
16	(x + 6) (x - 6) =	(x - 1) (x - 9) =		$x^2 - 36$	$x^2 - 10x + 9$	16
17	(x + 2) (x + 7) =	(x - 3) (x + 1) =		$x^2 + 9x + 14$	$x^2 - 2x - 3$	17
18	(x + 3) (x + 3) =	(x + 1) (x + 2) =		$x^2 + 6x + 9$	$x^2 + 3x + 2$	18
19	(x + 8) (x + 4) =	(x - 2) (x + 7) =		$x^2 + 12x + 32$	$x^2 + 5x - 14$	19
20	(x - 6) (x - 4) =	(x + 9) (x + 6) =		$x^2 - 10x + 24$	$x^2 + 15x + 54$	20

module VII

niv.1 : Jusqu'au deuxième degré

Applique la double distributivité.

	colonne 1	colonne 2	col1	col2	
21	(x + 6) (x + 1) =	(x - 5) (x + 9) =	$x^2 + 7x + 6$	$x^2 + 4x - 45$	21
22	(x + 10) (x - 8) =	(x - 8) (x - 5) =	$x^2 + 2x - 80$	$x^2 - 13x + 40$	22
23	(x + 3) (x - 8) =	(x - 5) (x + 2) =	$x^2 - 5x - 24$	$x^2 - 3x - 10$	23
24	(x - 3) (x + 9) =	(x - 7) (x - 9) =	$x^2 + 6x - 27$	$x^2 - 16x + 63$	24
25	(x + 5) (x - 1) =	(x + 6) (x + 2) =	$x^2 + 4x - 5$	$x^2 + 8x + 12$	25
26	(x + 4) (x + 1) =	(x + 5) (x + 2) =	$x^2 + 5x + 4$	$x^2 + 7x + 10$	26
27	(x + 10) (x + 3) =	(x - 3) (x - 1) =	$x^2 + 13x + 30$	$x^2 - 4x + 3$	27
28	(x - 3) (x + 2) =	(x - 5) (x - 2) =	$x^2 - x - 6$	$x^2 - 7x + 10$	28
29	(x + 1) (x - 5) =	(x + 1) (x + 8) =	$x^2 - 4x - 5$	$x^2 + 9x + 8$	29
30	(x + 7) (x + 9) =	(x + 7) (x - 8) =	$x^2 + 16x + 63$	$x^2 - x - 56$	30
31	(x + 1) (x - 1) =	(x + 7) (x + 4) =	$x^2 - 1$	$x^2 + 11x + 28$	31
32	(x + 8) (x + 4) =	(x + 6) (x - 1) =	$x^2 + 12x + 32$	$x^2 + 5x - 6$	32
33	(x + 5) (x + 4) =	(x - 6) (x - 2) =	$x^2 + 9x + 20$	$x^2 - 8x + 12$	33
34	(x + 5) (x + 7) =	(x - 1) (x + 7) =	$x^2 + 12x + 35$	$x^2 + 6x - 7$	34
35	(x - 7) (x + 3) =	(x + 1) (x + 4) =	$x^2 - 4x - 21$	$x^2 + 5x + 4$	35
36	(x + 1) (x - 6) =	(x + 6) (x - 9) =	$x^2 - 5x - 6$	$x^2 - 3x - 54$	36
37	(x - 4) (x - 1) =	(x - 9) (x - 8) =	$x^2 - 5x + 4$	$x^2 - 17x + 72$	37
38	(x + 2) (x - 6) =	(x - 8) (x + 6) =	$x^2 - 4x - 12$	$x^2 - 2x - 48$	38
39	(x - 3) (x + 9) =	(x - 8) (x - 1) =	$x^2 + 6x - 27$	$x^2 - 9x + 8$	39
40	(x - 6) (x + 8) =	(x + 8) (x - 5) =	$x^2 + 2x - 48$	$x^2 + 3x - 40$	40

module VII

niv.1 : Jusqu'au deuxième degré

Applique la double distributivité.

	colonne 1	colonne 2	col1	col2	
41	(-x + 3) (5x - 2) =	(2x + 7) (2x + 6) =	$-5x^2 + 17x - 6$	$4x^2 + 26x + 42$	41
42	(-2x - 8) (-3x + 4) =	(-2x - 1) (-x + 2) =	$6x^2 + 16x - 32$	$2x^2 - 3x - 2$	42
43	(3x - 7) (3x + 3) =	(2x - 3) (-x - 1) =	$9x^2 - 12x - 21$	$-2x^2 + x + 3$	43
44	(x + 10) (-3x + 7) =	(-3x - 8) (5x - 3) =	$-3x^2 - 23x + 70$	$-15x^2 - 31x + 24$	44
45	(-2x - 6) (5x + 1) =	(4x + 2) (-x + 7) =	$-10x^2 - 32x - 6$	$-4x^2 + 26x + 14$	45
46	(-2x - 1) (-2x + 9) =	(-2x - 5) (-4x + 6) =	$4x^2 - 16x - 9$	$8x^2 + 8x - 30$	46
47	(3x + 1) (-2x - 5) =	(2x + 7) (2x + 4) =	$-6x^2 - 17x - 5$	$-4x^2 - 6x + 28$	47
48	(-3x + 5) (-x - 8) =	(2x + 6) (2x + 8) =	$3x^2 + 19x - 40$	$4x^2 + 28x + 48$	48
49	(3x + 7) (-x - 4) =	(4x - 2) (4x - 1) =	$-3x^2 - 19x - 28$	$16x^2 - 12x + 2$	49
50	(3x + 2) (x + 1) =	(-3x + 7) (2x - 4) =	$3x^2 + 5x + 2$	$-6x^2 + 26x - 28$	50
51	(4x + 6) (x + 8) =	(4x - 2) (3x - 1) =	$4x^2 + 38x + 48$	$12x^2 - 10x + 2$	51
52	(2x - 1) (-2x + 3) =	(2x + 1) (3x - 7) =	$-4x^2 + 8x - 3$	$6x^2 - 11x - 7$	52
53	(-4x + 5) (-x - 6) =	(-3x + 8) (3x + 5) =	$4x^2 + 19x - 30$	$-9x^2 + 9x + 40$	53
54	(x - 3) (3x - 3) =	(x + 1) (-3x + 6) =	$3x^2 - 12x + 9$	$-3x^2 + 3x + 6$	54
55	(3x - 1) (-4x - 9) =	(2x + 8) (-x + 6) =	$-12x^2 - 23x + 9$	$-2x^2 + 4x + 48$	55
56	(4x - 2) (2x + 4) =	(3x + 2) (-2x + 6) =	$8x^2 + 12x - 8$	$-6x^2 + 14x + 12$	56
57	(4x + 8) (4x - 7) =	(5x + 2) (-2x - 1) =	$16x^2 + 4x - 56$	$-10x^2 - 9x - 2$	57
58	(-x + 7) (5x + 10) =	(x + 9) (-4x + 4) =	$-5x^2 + 25x + 70$	$-4x^2 - 32x + 36$	58
59	(2x + 4) (-x - 3) =	(-2x + 1) (-x - 4) =	$-2x^2 - 10x - 12$	$2x^2 + 7x - 4$	59
60	(2x + 4) (3x - 6) =	(x - 8) (4x + 6) =	$6x^2 - 24$	$4x^2 - 26x - 48$	60

module VII

niv.1 : Jusqu'au deuxième degré

Applique la double distributivité.

	colonne 1	colonne 2	col1	col2	
61	(5x + 8) (-3x + 2) =	(-3x + 9) (-2x + 8) =	$-15x^2 - 14x + 16$	$6x^2 - 42x + 72$	61
62	(-x + 6) (x - 3) =	(3x - 7) (-2x - 7) =	$-x^2 + 9x - 18$	$-6x^2 - 7x + 49$	62
63	(-x + 8) (x + 5) =	(-3x + 5) (2x + 8) =	$-x^2 + 3x + 40$	$-6x^2 - 14x + 40$	63
64	(x - 6) (-2x + 5) =	(4x - 4) (-2x + 6) =	$-2x^2 + 17x - 30$	$-8x^2 + 32x - 24$	64
65	(-2x + 1) (2x + 1) =	(4x + 8) (x - 3) =	$-4x^2 + 1$	$4x^2 - 4x - 24$	65
66	(2x + 8) (3x + 7) =	(x - 4) (3x - 8) =	$6x^2 + 38x + 56$	$3x^2 - 20x + 32$	66
67	(-3x + 9) (3x + 9) =	(4x - 6) (3x + 2) =	$-9x^2 + 81$	$12x^2 - 10x - 12$	67
68	(-2x + 9) (4x + 3) =	(x + 3) (2x - 5) =	$-8x^2 + 30x + 27$	$2x^2 + x - 15$	68
69	(-3x + 9) (-2x + 10) =	(3x - 4) (4x + 6) =	$6x^2 - 48x + 90$	$12x^2 + 2x - 24$	69
70	(x + 6) (-x - 7) =	(2x - 5) (2x - 4) =	$-x^2 - 13x - 42$	$4x^2 - 18x + 20$	70
71	(2x + 5) (-x - 9) =	(4x + 6) (5x + 7) =	$-2x^2 - 23x - 45$	$20x^2 + 58x + 42$	71
72	(-4x - 3) (4x + 8) =	(x + 2) (2x + 1) =	$-16x^2 - 44x - 24$	$2x^2 + 5x + 2$	72
73	(-3x - 3) (3x - 7) =	(2x - 3) (2x - 8) =	$-9x^2 + 12x + 21$	$4x^2 - 22x + 24$	73
74	(-3x - 8) (- 2x - 3) =	(2x + 3) (-x - 9) =	$6x^2 + 25x + 24$	$-2x^2 - 21x - 27$	74
75	(4x - 7) (2x + 2) =	(-4x - 3) (-x + 5) =	$8x^2 - 6x - 14$	$4x^2 - 17x - 15$	75
76	(4x + 3) (5x + 8) =	(2x - 7) (-3x + 5) =	$20x^2 + 47x + 24$	$-6x^2 + 31x - 35$	76
77	(5x + 8) (5x - 6) =	(4x + 2) (x - 8) =	$25x^2 + 10x - 48$	$4x^2 - 30x - 16$	77
78	(x - 4) (-x - 2) =	(2x - 3) (x - 6) =	$-x^2 + 2x + 8$	$2x^2 - 15x + 18$	78
79	(4x + 8) (-2x - 5) =	(2x - 8) (-x + 1) =	$-8x^2 - 36x - 40$	$-2x^2 + 10x - 8$	79
80	(2x + 6) (-3x + 2) =	(-3x - 4) (x - 4) =	$-6x^2 - 14x + 12$	$-3x^2 + 8x + 16$	80

module VII

niv.2 : puissances supérieures au deuxième degré

Applique la double distributivité.

	colonne 1	colonne 2	col1	col2	
1	$(x^3 + 8) . (12y^4 - 3)$	$(-2c^2 + 5) . (5c^2 + 11)$	$12x^3y^4 - 3x^3 + 96y^4 - 24$	$10c^4 - 47c^2 + 55$	1
2	$(7x - 12) . (-5d^2 - 9)$	$(4c - 4) . (-c^3 + 3)$	$-35d^2x - 63x + 60d^2 + 108$	$-4c^4 + 12c + 4c^3 - 12$	2
3	$(-5y - 5) . (10d + 9)$	$(4z + 5) . (-3b^3 + 6)$	$-50dy - 45y - 50d - 45$	$-12b^3z + 24z - 15b^3 + 30$	3
4	$(4c - 9) . (8b + 11)$	$(-c^3 + 12) . (-a^4 - 10)$	$32bc + 44c - 72b - 99$	$a^4c^3 + 10c^3 - 12a^4 - 120$	4
5	$(3z + 6) . (8d + 4)$	$(-12c^4 + 8) . (12d + 7)$	$24dz + 12z + 48d + 24$	$-144c^4d - 84c^4 + 96d + 56$	5
6	$(-12z^4 - 3) . (4b + 8)$	$(4a - 2) . (-5a - 11)$	$-48bz^4 - 96z^4 - 12b - 24$	$-20a^2 - 34a + 22$	6
7	$(-11y + 1) . (-4z - 7)$	$(4a^4 + 9) . (-5y^4 + 10)$	$44yz + 77y - 4z - 7$	$-20a^4y^4 + 40a^4 - 45y^4 + 90$	7
8	$(2d^2 - 10) . (8z^2 + 7)$	$(12a^3 + 8) . (-10y - 3)$	$16d^2z^2 + 14d^2 - 80z^2 - 70$	$-120a^3y - 36a^3 - 80y - 24$	8
9	$(4z + 3) . (-10y - 2)$	$(-3d^3 + 7) . (3z + 5)$	$-40yz - 8z - 30y - 6$	$-9d^3z - 15d^3 + 21z + 35$	9
10	$(-9c^2 - 3) . (11y^3 + 4)$	$(-4d^2 - 11) . (3z^3 + 12)$	$-99c^2y^3 - 36c^2 - 33y^3 - 12$	$-12d^2z^3 - 48d^2 - 33z^3 - 132$	10
11	$(12a - 12) . (7a - 7)$	$(2y - 5) . (-2c + 9)$	$84a^2 - 168a + 84$	$-4cy + 18y + 10c - 45$	11
12	$(-5z - 1) . (9z - 10)$	$(-4b^2 + 11) . (2b^2 - 6)$	$-45z^2 + 41z + 10$	$-8b^4 + 46b^2 - 66$	12
13	$(3y^2 - 8) . (-12y^3 - 4)$	$(-11c + 12) . (9d^4 + 10)$	$-36y^5 - 12y^2 + 96y^3 + 32$	$99cd^4 - 110c - 108d^4 + 120$	13
14	$(-b - 7) . (-3y^3 + 10)$	$(-12b - 10) . (-12b + 12)$	$3by^3 - 10b + 21y^3 - 70$	$-144b^2 - 24b - 120$	14
15	$(-2x^2 - 1) . (11x^4 + 7)$	$(x - 2) . (d^4 + 10)$	$-22x^6 - 14x^2 - 11x^4 - 7$	$d^4x + 10x - 2d^4 - 20$	15
16	$(6x^3 + 3) . (8x^2 + 11)$	$(-9d^2 + 4) . (- 7a^3 - 10)$	$48x^5 + 66x^3 + 24x^2 + 33$	$63a^3d^2 + 90d - 28a^3 - 40$	16
17	$(-9x - 8) . (6d + 1)$	$(3z^3 + 9) . (- 4z + 3)$	$-54dx - 9x - 48d - 8$	$-12z^4 + 9z^3 - 36z + 27$	17
18	$(8z - 5) . (- 4d - 7)$	$(-3d - 5) . (7d + 12)$	$-32dz - 56z + 20d + 35$	$-21d^2 - 71d - 60$	18
19	$(3b - 3) . (2b - 7)$	$(2y + 11) . (4y - 9)$	$6b^2 - 27b + 21$	$8y^2 + 26y - 99$	19
20	$(7b^4 - 3) . (9y^2 - 5)$	$(-6b - 6) . (2b + 3)$	$63b^4y^2 - 35b^4 - 27y^2 + 15$	$-12b^2 - 30b - 18$	20

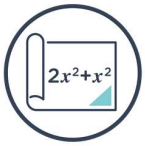
module VII

niv.2 : puissances supérieures au deuxième degré

Applique la double distributivité.

	colonne 1	colonne 2	col1	col2	
21	(-2c + 1) . (-c - 1) =	(9a + 5) . (12a - 8) =	$2c^2 + c - 1$	$108a^2 - 12a - 40$	21
22	$(8y^2 + 4) . (10z - 12) =$	$(- 8c^2 + 1) . (5c^3 + 11) =$	$80y^2z - 96y^2 + 40z - 48$	$-40c^5 - 88c^2 + 5c^3 + 11$	22
23	(- 8z + 2) . (- 8c - 2) =	(- 3z - 11) . (- 9c - 7) =	64cz + 16z - 16c - 4	27cz + 21z + 99c + 77	23
24	$(- 2b^2 + 11) . (6b^2 - 7) =$	$(4a + 11) . (7c^3 + 12) =$	$-12b^4 + 80b^2 - 77$	$28ac^3 + 48a + 77c^3 + 132$	24
25	(9y - 1) . (- 3z - 5) =	(12x + 1) . (5a - 7) =	-27yz - 45y + 3z + 5	60ax - 84x + 5a - 7	25
26	$(8c^4 - 11) . (12d^4 - 3) =$	$(- 10b^4 - 9) . (3d - 3) =$	$96c^4d^4 - 24c^4 - 132d^4 + 33$	$-30b^4d + 30b^4 - 27d + 27$	26
27	(3b + 9) . (- 10a - 7) =	(6d + 1) . (- 6d + 9) =	-30ab - 21b - 90a - 63	$-36d^2 + 48d + 9$	27
28	(8x + 2) . (10x + 4) =	$(3y^4 - 1) . (- 4d^3 - 9) =$	$80x^2 + 52x + 8$	$-12d^3y^4 - 27y^4 + 4d^3 + 9$	28
29	(12x - 12) . (- 5a + 8) =	$(- z^2 + 1) . (5z^4 - 3) =$	-60ax + 96x + 60a - 96	$-5z^6 + 3z^2 + 5z^4 - 3$	29
30	$(- 2c^2 - 1) . (- 12a^3 - 6) =$	$(2y - 6) . (8x^3 - 9) =$	$24a^3c^2 + 12c^2 + 12a^3 + 6$	$16x^3y - 18y - 48x^3 + 54$	30
31	$(3c^3 - 3) . (9z^2 + 4) =$	(- 6x + 8) . (7a + 1) =	$27c^3z^2 + 12c^3 - 27z^2 - 12$	-42ax - 6x + 56a + 8	31
32	(10a - 9) . (- 3b - 12) =	$(- 5z^3 - 5) . (- 5y - 7) =$	-30ab - 120a + 27b + 108	$25yz^3 + 35z^3 + 25y + 35$	32
33	$(- 7z - 1) . (- 12z^4 - 7) =$	(- 7c - 4) . (c - 1) =	$84z^5 + 49z + 12z^4 + 7$	$-7c^2 + 3c + 4$	33
34	(11z + 11) . (- 12b - 7) =	$(- 3a^4 - 3) . (- 3x - 8) =$	-132bz - 77z - 132b - 77	$9a^4x + 24a^4 + 9x + 24$	34
35	$(- 5z^3 - 11) . (- 2a^3 - 6) =$	(- 7a + 7) . (8a - 11) =	$10a^3z^3 + 30z^3 + 22a^3 + 66$	$- 56a^2 + 133a - 77$	35
36	(- 11z - 1) . (- 5z + 5) =	$(- 5x^3 + 4) . (- 7x^3 - 11) =$	$55z^2 - 50z - 5$	$35x^6 + 27x^3 - 44$	36
37	(- 9y - 1) . (12c + 1) =	(-6a - 4) . (- 10a + 12) =	-108cy - 9y - 12c - 1	$60a^2 - 32a - 48$	37
38	(- x + 7) . (2a - 9) =	(11d + 12) . (- 10a + 5) =	-2ax + 9x + 14a - 63	-110ad + 55d - 120a + 60	38
39	(10z + 9) . (6z + 6) =	(- 9a - 12) . (- 8z - 12) =	$60z^2 + 114z + 54$	72az + 108a + 96z + 144	39
40	$(5y^3 - 10) . (- 5d - 12) =$	(- 10c - 5) . (- 9c + 9) =	$-25dy^3 - 60y^3 + 50d + 120$	$90c^2 - 45c - 45$	40

module VIII



niv.1 : application des formules

Applique les produits remarquables pour développer.

	colonne 1	colonne 2	col 1	col 2	
1	$(x + 6)^2$ =	$(x + 3)(x - 3)$ =	$x^2 + 12x + 36$	$x^2 - 9$	1
2	$(x + 7)^2$ =	$(x + 4)(x - 4)$ =	$x^2 + 14x + 49$	$x^2 - 16$	2
3	$(x + 10)(x - 10)$ =	$(x - 10)^2$ =	$x^2 - 100$	$x^2 - 20x + 100$	3
4	$(x - 6)^2$ =	$(x + 5)(x - 5)$ =	$x^2 - 12x + 36$	$x^2 - 25$	4
5	$(x + 2)(x - 2)$ =	$(x + 6)(x - 6)$ =	$x^2 - 4$	$x^2 - 36$	5
6	$(x - 5)^2$ =	$(x + 1)(x - 1)$ =	$x^2 - 10x + 25$	$x^2 - 1$	6
7	$(x + 10)^2$ =	$(x + 8)(x - 8)$ =	$x^2 + 20x + 100$	$x^2 - 64$	7
8	$(x + 2)^2$ =	$(x + 3)^2$ =	$x^2 + 4x + 4$	$x^2 + 6x + 9$	8
9	$(x - 2)^2$ =	$(x + 12)(x - 12)$ =	$x^2 - 4x + 4$	$x^2 - 144$	9
10	$(x - 3)^2$ =	$(x + 1)^2$ =	$x^2 - 6x + 9$	$x^2 + 2x + 1$	10
11	$(x + 7)(x - 7)$ =	$(x + 8)(x - 8)$ =	$x^2 - 49$	$x^2 - 64$	11
12	$(x - 1)^2$ =	$(x + 5)(x - 5)$ =	$x^2 - 2x + 1$	$x^2 - 25$	12
13	$(x - 0)^2$ =	$(x + 14)(x - 14)$ =	x^2	$x^2 - 49$	13
14	$(x + 11)(x - 11)$ =	$(x + 7)^2$ =	$x^2 - 121$	$x^2 + 14x + 49$	14
15	$(x + 8)^2$ =	$(x + 8)^2$ =	$x^2 + 16x + 64$	$x^2 + 16x + 64$	15
16	$(x + 9)(x - 9)$ =	$(x - 8)^2$ =	$x^2 - 81$	$x^2 - 16x + 64$	16
17	$(x + 9)^2$ =	$(x + 1)^2$ =	$x^2 + 18x + 81$	$x^2 + 2x + 1$	17
18	$(x - 8)^2$ =	$(x + 10)(x - 10)$ =	$x^2 - 16x + 64$	$x^2 - 100$	18
19	$(x - 9)^2$ =	$(x - 10)^2$ =	$x^2 - 18x + 81$	$x^2 - 20x + 100$	19
20	$(x - 4)^2$ =	$(x + 13)(x - 13)$ =	$x^2 - 8x + 16$	$x^2 - 169$	20

module VIII

niv.2 : développement et factorisation

Développe ou factorise en appliquant les produits remarquables.

	développe	factorise		développement	factorisation	
1	$(x + 9)^2$ =	$x^2 - 16$ =		$x^2 + 18x + 81$	$(x + 4)(x - 4)$	1
2	$(x - 6)^2$ =	$x^2 - 10x + 25$ =		$x^2 - 12x + 36$	$(x - 5)^2$	2
3	$(x + 5)(x - 5)$ =	$x^2 - 121$ =		$x^2 - 25$	$(x + 11)(x - 11)$	3
4	$(x + 1)(x - 1)$ =	$x^2 - 16x + 64$ =		$x^2 - 1$	$(x - 8)^2$	4
5	$(x + 7)(x - 7)$ =	$x^2 - 196$ =		$x^2 - 49$	$(x + 14)(x - 14)$	5
6	$(x + 3)(x - 3)$ =	$x^2 + 12x + 36$ =		$x^2 - 9$	$(x + 6)^2$	6
7	$(x + 4)(x - 4)$ =	$x^2 - 8x + 16$ =		$x^2 - 16$	$(x - 4)^2$	7
8	$(x + 5)^2$ =	$x^2 - 324$ =		$x^2 + 10x + 25$	$(x + 18)(x - 18)$	8
9	$(x + 10)^2$ =	$x^2 - 18x + 81$ =		$x^2 + 20x + 100$	$(x - 9)^2$	9
10	$(x + 9)(x - 9)$ =	$x^2 + 14x + 49$ =		$x^2 - 81$	$(x + 7)^2$	10
11	$(x + 10)(x - 10)$ =	$x^2 + 4x + 4$ =		$x^2 - 100$	$(x + 2)^2$	11
12	$(x + 12)(x - 12)$ =	$x^2 - 49$ =		$x^2 - 144$	$(x + 7)(x - 7)$	12
13	$(x - 3)^2$ =	$x^2 - 25$ =		$x^2 - 6x + 9$	$(x + 5)(x - 5)$	13
14	$(x - 7)^2$ =	$x^2 - 36$ =		$x^2 - 14x + 49$	$(x + 6)(x - 6)$	14
15	$(x + 13)(x - 13)$ =	$x^2 - 12x + 36$ =		$x^2 - 169$	$(x - 6)^2$	15
16	$(x + 6)^2$ =	$x^2 + 2x + 1$ =		$x^2 + 12x + 36$	$(x + 1)^2$	16
17	$(x - 8)^2$ =	$x^2 - 6x + 9$ =		$x^2 - 16x + 64$	$(x - 3)^2$	17
18	$(x + 6)(x - 6)$ =	$x^2 - 16$ =		$x^2 - 36$	$(x + 4)(x - 4)$	18
19	$(x + 2)(x - 2)$ =	$x^2 - 4$ =		$x^2 - 4$	$(x + 2)(x - 2)$	19
20	$(x - 5)^2$ =	$x^2 + 18x + 81$ =		$x^2 - 10x + 25$	$(x + 9)^2$	20

niv.2 : développement et factorisation

Développe ou factorise en appliquant les produits remarquables.

	développe	factorise		développement	factorisation	
21	$(x + 15)(x - 15) =$	$x^2 + 18x + 81 =$		$x^2 - 225$	$(x + 9)^2$	21
22	$(x + 16)(x - 16) =$	$x^2 - 64 =$		$x^2 - 256$	$(x + 8)(x - 8)$	22
23	$(x + 17)(x - 17) =$	$x^2 - 6x + 9 =$		$x^2 - 289$	$(x - 3)^2$	23
24	$(x + 2)(x - 2) =$	$x^2 - 81 =$		$x^2 - 4$	$(x + 9)(x - 9)$	24
25	$(x + 3)(x - 3) =$	$x^2 - 4 =$		$x^2 - 9$	$(x + 2)(x - 2)$	25
26	$(x + 2)^2 =$	$x^2 - 1 =$		$x^2 + 4x + 4$	$(x + 1)(x - 1)$	26
27	$(x - 8)^2 =$	$x^2 - 49 =$		$x^2 - 16x + 64$	$(x + 7)(x - 7)$	27
28	$(x - 4)^2 =$	$x^2 - 100 =$		$x^2 - 8x + 16$	$(x + 10)(x - 10)$	28
29	$(x - 6)^2 =$	$x^2 - 144 =$		$x^2 - 12x + 36$	$(x + 12)(x - 12)$	29
30	$(x + 6)(x - 6) =$	$x^2 - 169 =$		$x^2 - 36$	$(x + 13)(x - 13)$	30
31	$(x + 9)^2 =$	$x^2 - 225 =$		$x^2 + 18x + 81$	$(x + 15)(x - 15)$	31
32	$(x + 10)^2 =$	$x^2 - 256 =$		$x^2 + 20x + 100$	$(x + 16)(x - 16)$	32
33	$(x + 11)(x - 11) =$	$x^2 - 289 =$		$x^2 - 121$	$(x + 17)(x - 17)$	33
34	$(x + 12)(x - 12) =$	$x^2 - 361 =$		$x^2 - 144$	$(x + 19)(x - 19)$	34
35	$(x + 14)(x - 14) =$	$x^2 - 400 =$		$x^2 - 196$	$(x + 20)(x - 20)$	35
36	$(x + 3)^2 =$	$x^2 - 14x + 49 =$		$x^2 + 6x + 9$	$(x - 7)^2$	36
37	$(x - 7)^2 =$	$x^2 - 25 =$		$x^2 - 14x + 49$	$(x + 5)(x - 5)$	37
38	$(x + 5)^2 =$	$x^2 + 16x + 64 =$		$x^2 + 10x + 25$	$(x + 8)^2$	38
39	$(x - 5)^2 =$	$x^2 - 36 =$		$x^2 - 10x + 25$	$(x + 6)(x - 6)$	39
40	$(x + 18)(x - 18) =$	$x^2 - 9 =$		$x^2 - 324$	$(x + 3)(x - 3)$	40

niv.2 : développement et factorisation

Développe ou factorise en appliquant les produits remarquables.

	développe	factorise		développement	factorisation	
41	$(x + 7)^2$ =	$x^2 - 2x + 1$ =		$x^2 + 14x + 49$	$(x - 1)^2$	41
42	$(x - 5)^2$ =	$x^2 - 100$ =		$x^2 - 10x + 25$	$(x + 10)(x - 10)$	42
43	$(x + 4)^2$ =	x^2 =		$x^2 + 8x + 16$	$(x - 0)^2$	43
44	$(x + 5)(x - 5)$ =	$x^2 - 144$ =		$x^2 - 25$	$(x + 12)(x - 12)$	44
45	$(x + 6)^2$ =	$x^2 - 196$ =		$x^2 + 12x + 36$	$(x + 14)(x - 14)$	45
46	$(x + 3)(x - 3)$ =	$x^2 - 1$ =		$x^2 - 9$	$(x + 1)(x - 1)$	46
47	$(x + 6)(x - 6)$ =	$x^2 - 16x + 64$ =		$x^2 - 36$	$(x - 8)^2$	47
48	$(x + 7)(x - 7)$ =	$x^2 - 8x + 16$ =		$x^2 - 49$	$(x - 4)^2$	48
49	$(x + 10)(x - 10)$ =	$x^2 - 14x + 49$ =		$x^2 - 100$	$(x - 7)^2$	49
50	$(x + 2)(x - 2)$ =	$x^2 - 10x + 25$ =		$x^2 - 4$	$(x - 5)^2$	50
51	$(x + 12)(x - 12)$ =	$x^2 + 6x + 9$ =		$x^2 - 144$	$(x + 3)^2$	51
52	$(x + 9)^2$ =	$x^2 - 4x + 4$ =		$x^2 + 18x + 81$	$(x - 2)^2$	52
53	$(x + 10)^2$ =	$x^2 - 64$ =		$x^2 + 20x + 100$	$(x + 8)(x - 8)$	53
54	$(x + 14)(x - 14)$ =	$x^2 - 9$ =		$x^2 - 196$	$(x + 3)(x - 3)$	54
55	$(x - 9)^2$ =	$x^2 - 81$ =		$x^2 - 18x + 81$	$(x + 9)(x - 9)$	55
56	$(x + 8)(x - 8)$ =	$x^2 + 16x + 64$ =		$x^2 - 64$	$(x + 8)^2$	56
57	$(x + 4)(x - 4)$ =	$x^2 - 121$ =		$x^2 - 16$	$(x + 11)(x - 11)$	57
58	$(x + 5)^2$ =	$x^2 + 8x + 16$ =		$x^2 + 10x + 25$	$(x + 4)^2$	58
59	$(x + 1)(x - 1)$ =	$x^2 - 169$ =		$x^2 - 1$	$(x + 13)(x - 13)$	59
60	$(x + 8)^2$ =	$x^2 - 225$ =		$x^2 + 16x + 64$	$(x + 15)(x - 15)$	60

module IX

niv.1 : Quotient de puissances

Applique les propriétés des puissances.

	colonne 1	colonne 2	col 1	col 2	
1	$16a^2c^7/b^4c^9$	$a^8/13a^6$	c	$a^2/13$	1
2	$a^9c/12a^5c$	$a^6/-7a^8c^3$	$a^4/12$	$-1/7a^2c^3$	2
3	$12a^4c^4/10$	$4a^8c^9/24b^2c^2$	$6a^4c^4/5b^5$	$a^8c^7/6b^2$	3
4	$4a^9c^4/5b^5c^8$	$8a^9c^3/6b^3c^6$	$4a^9/5b^5c^4$	$4a^9/3b^3c^3$	4
5	$16b/6b^4$	$-5ac^3/a^7$	$8/3b^3$	$-5c^3/a^6$	5
6	$-8b^5c^2/b^7$	$7b^9c^5/18b^4$	$-8c^2/b^2$	$7b^5c^5/18$	6
7	$8b^6c^8/-18a^2c^2$	$10a^7/26b^7c^5$	$-4b^6c^6/9a^2$	$5a^7/13b^7c^5$	7
8	$a^5c^6/10a^3c^6$	$22a^6c^6/11b^6c^2$	$a^2/10$	$2a^6c^4/b^6$	8
9	$-4b^8c^5/-3b$	$8a^2c^8/18b^7$	$4b^7c^5/3$	$4a^2c^8/9b^7$	9
10	$-6a^9/3a^3$	b^7c^6/b^8	$-2a^6$	c^6/b	10
11	$6a^2/-14b^2c^6$	$5b^5c^7/b^9$	$-3a^2/7b^2c^6$	$5c^7/b^4$	11
12	$-6a^2c^7/26b^6c^8$	$-6a^5c^3/a^2$	$-3a^2/13b^6c$	$-6a^3c^3$	12
13	$6b^8/b^2$	$12a^3/12bc^2$	$6b^6$	a^3/bc^2	13
14	$7a^2/a^8c^9$	$14b^7/b^9$	$7/a^6c^9$	$14/b^2$	14
15	$-16b^3c^3/b^3c^2$	b^5c^9/a^2c^6	$-16c$	b^5c^3/a^2	15
16	b^2/b^5	$12a^6/4b^8$	$1/b^3$	$3a^6/b^8$	16
17	$-11b^9c^4/8a^2c^4$	$-16bc^8/8b^5$	$-11b^9/8a^2$	$-2c^8/b^4$	17
18	$6a^3c^6/-9b^6$	$-12b^2/20bc^6$	$-2a^3c^6/3b^6$	$-3b/5c^6$	18
19	$12b^4/10b^6$	$18a^8/a^3$	$6/5b^2$	$18a^5$	19
20	$b^3c^3/4bc^5$	$-11b^5c^8/20b^3c^6$	$b^2/4c^2$	$-11b^2c^2/20$	20

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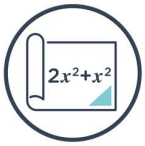
niv.1 : Quotient de puissances

Applique les propriétés des puissances.

	colonne 1	colonne 2	col 1	col 2	
21	$-10b^5/10b^7c^9$	$b^3c^4/12b.c^2$	$-1/b^2c^9$	$bc^2/12$	21
22	$20b^7c^5/10a^3$	$20a^9c^8/9b^3c^9$	$2b^7c^5/a^3$	$20a^9/9b^3c$	22
23	$a^7c^9/-3a$	$-14a^5c^4/14b^8c^7$	$-1a^6c^9/3$	$-1a^5/b^8c^3$	23
24	$-14a^9c^9/-8a^4$	$12a^2/11a^3$	$7a^5c^9/4$	$12/11a$	24
25	$-14b/26a^9c^9$	$a^4/3a^2c^3$	$-7b/13a^9c^9$	$a^2/3c^3$	25
26	$22a^8/10b^5$	$24b^6/4a^4$	$11a^8/5b^5$	$6b^6/a^4$	26
27	$26b^4c^3/7b^6c^7$	$-26a^5/-8b^2c$	$26/7b^2c^4$	$13a^5/4b^2c$	27
28	$b^8c^8/4b^9c^4$	$a^6/26a^8c$	$c^4/4b$	$1/26a^2c$	28
29	$26a^5c^2/7a^4c^2$	$13a^4c^6/a^3c^5$	$26a/7$	$13ac$	29
30	$16b^9c^2/b^3c$	$5a^6c^7/-12b^4$	$16b^6c$	$-5a^6c^7/12b^4$	30
31	$16b^2c/b^7c^4$	$12a^6/a^9$	$16/b^5c^3$	$12/a^3$	31
32	$20a^7c^3/-16b^7$	$3b^2c^4/10a^9c^5$	$-5a^7c^3/4b^7$	$3b^2/10a^9c$	32
33	$-22a^4c^5/18a^2c^6$	$-8b^7/10a^5c^5$	$-11a^2/9c$	$-4b^7/5a^5c^5$	33
34	$13a^5/6a^4c$	$24a^2c^8/6a^2$	$13a/6c$	$4c^8$	34
35	$6a^5c^5/b^7c^5$	a^5c^6/b^2c^4	$6a^5/b^7$	a^5c^2/b^2	35
36	$-8b^9/5b^3$	$3a^2/4a^2$	$-8b^6/5$	$3/4$	36
37	$b^6/10b^4c^6$	$12a^8c^7/-7a^9$	$b^2/10c^6$	$-2c^7/a$	37
38	$-12a^4/a^6c^8$	$8b/10b^4c^3$	$-12/a^2c^8$	$4/5b^3c^3$	38
39	$8a^7c/b^6c^9$	$16b^2/3b^3c^6$	$8a^7/b^6c^8$	$16/3bc^6$	39
40	$24ac^2/ac^6$	$-26b^5/5b^9c^4$	$24/c^4$	$-26/5b^4c^4$	40

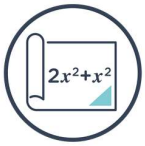
module IX



niv.2 : Puissances d'un quotient

Applique les propriétés des puissances.

	colonne 1	colonne 2	col1	col2	
1	$((-4b^6)/(3b^2))^2$	$((-14a^2)/(7b^5c^5))^3$	$16b^8/9$	$-8a^6/b^{15}c^{15}$	1
2	$((6a^7c^9)/(14b^2c^3))^2$	$((a^6)/(b^9c^2))^2$	$9a^{14}c^{12}/49b^4$	$a^{12}/b^{18}c^4$	2
3	$((a^6)/(a^3))^4$	$((8b^2c^5)/(7b^8c^2))3$	a^{12}	$512c^9/343b^{18}$	3
4	$((10b^2c^9)/(6b^2))^3$	$((5a^9c^3)/(8a^8c^3))^2$	$125c^{27}/27b^0$	$25a^2/64c^0$	4
5	$((8b^5)/(8b^2))^3$	$((16a^8c^9)/(-3a^9c))^2$	b^9	$256c^{16}/9a^2$	5
6	$((8b^4)/(8b^5))^2$	$((b^8c^9)/(a8))^3$	$1/b^2$	$b^{24}c^{27}/a^{24}$	6
7	$((-10a^2c^4)/(-6b^7))^2$	$((-4a^7c)/(-14b^2c^3))^2$	$25a^4c^8/9b^{14}$	$4a^{14}/49b^4c^4$	7
8	$((3a^8c^7)/(-7a))^2$	$((12a^2c^9)/(-6a^5))^2$	$9a^{14}c^{14}/49$	$4c^{18}/a^6$	8
9	$((-3a^3)/(12b^3c^7))^2$	$((-6b^7c^8)/(-4a^2c^4))^4$	$a^6/16b^6c^{14}$	$81b^{28}c^{16}/16a^8$	9
10	$((8ac^4)/(-14b^5))^2$	$((-8a^3c^7)/(-10a^8))^4$	$16a^2c^8/49b^{10}$	$256c^{28}/625a^{20}$	10
11	$((b^7)/(a^8))^2$	$((12b^3c^5)/(-6b^4))^2$	b^{14}/a^{16}	$4c^{10}/b^2$	11
12	$((-6a^7)/(8a^8))^3$	$((-8b^8c^3)/(3a^9))^2$	$-27/64a^3$	$64b^{16}c^6/9a^{18}$	12
13	$((6b^8)/(-12b^9c^9))^3$	$((-4bc^9)/(-8b^7))^4$	$-1/8b^3c^{27}$	$c^{36}/16b^{24}$	13
14	$((-6a^6)/(-4b^5))^3$	$((b^6)/(a^8))^2$	$27a^{18}/8b^{15}$	b^{12}/a^{16}	14
15	$((-8ac^7)/(16a^7c^7))^4$	$((b^6)/(b^2))^4$	$1/16a^{27}c^0$	b^{16}	15
16	$((8b^5c^6)/(6a^6c^3))^4$	$((a^9c)/(b^3c^2))^4$	$256b^{20}c^{12}/81a^{24}$	$a^{36}/b^{12}c^4$	16
17	$((14b^2c^5)/(8a^4c^4))^3$	$((-5b^6)/(-4b^4c))^4$	$343b^6c^3/64a^{12}$	$625b^8/256c^4$	17
18	$((7b^2c^7)/(-7a^7c^5))^2$	$((6a^5)/(-6b^2))^4$	b^4c^4/a^{14}	a^{20}/b^8	18
19	$((-14ac^2)/(6b^2c^5))^2$	$((6b^3)/(8ac))^4$	$49a^2/9b^4c^6$	$81b^{12}/256a^4c^4$	19
20	$((-4b^4c)/(6bc^2))^4$	$((6a^3c^4)/(-8b))^3$	$16b^{12}/81c^4$	$-27a^9c^{12}/64b^3$	20

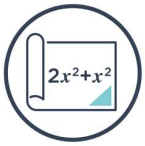


niv.3 : Distributivité - mise en évidence sans p

Applique la simple distributivité ou la mise en évidence

	distribuer	mettre en évidence		distribuer	mettre en évidence	
1	$36ab + 63a$	$25 - 10m$		$9a \cdot (4b + 7)$	$5 \cdot (5 - 2m)$	1
2	$9n^5p^7 + 27m^2n^4p^3$	$3y - 27xy$		$9n^4p^3 \cdot (np^4 + 3m^2)$	$3y \cdot (1 - 9x)$	2
3	$56y + 35xy$	$16y + 14x$		$7y \cdot (8 + 5x)$	$2 \cdot (8y + 7x)$	3
4	$72xy - 8y$	$72n + 8mn$		$8y \cdot (9x - 1)$	$8n \cdot (9 + m)$	4
5	$9e^4f^2g^3 + 3e^3f^2$	$24e + 42ef$		$3e^3f^2 \cdot (3eg^3 + 1)$	$6e \cdot (4 + 7f)$	5
6	$16f^6g^3 + 12e^5f^3g^7$	$35ab + 63a$		$4f^3g^3 \cdot (4f^3 + 3e^5g^4)$	$7a \cdot (5b + 9)$	6
7	$40x^3y^3z^2 - 56xy^8$	$14 + 35a$		$8xy^3 \cdot (5x^2z^2 - 7y^5)$	$7 \cdot (2 + 5a)$	7
8	$6a^2b^5c^9 + 54b^4c^4$	$8 + 72f$		$6b^4c^4 \cdot (a^2bc^5 + 9)$	$8 \cdot (1 + 9f)$	8
9	$32m^7p^8 + 20m^4n^3p^4$	$8b - 56a$		$4m^4p^4 \cdot (8m^3p^4 + 5n^3)$	$8 \cdot (b - 7a)$	9
10	$15 + 20ab$	$42mn + 7m$		$5 \cdot (3 + 4ab)$	$7m \cdot (6n + 1)$	10
11	$21m + 6mn$	$30a - 36b$		$3m \cdot (7 + 2n)$	$6 \cdot (5a - 6b)$	11
12	$20a^6b^6c^5 + 32a^2b^3$	$10xy - 15x$		$4a^2b^3 \cdot (5a^4b^3c^5 + 8)$	$5x \cdot (2y - 3)$	12
13	$6f + 42ef$	$8 + 3n$		$6f \cdot (1 + 7e)$	$1 \cdot (8 + 3n)$	13
14	$54n^4p^4 + 48m^5n^8p^6$	$72mn - 8m$		$6n^4p^4 \cdot (9 + 8m^5n^4p^2)$	$8m \cdot (9n - 1)$	14
15	$14x + 12$	$9mn - 24n$		$2 \cdot (7x + 6)$	$3n \cdot (3m - 8)$	15
16	$72n^6p + 63mnp^3$	$8n - 40$		$9np \cdot (8n^5 + 7mp^2)$	$8 \cdot (n - 5)$	16
17	$4x^9y^5 + 36x^4y^{10}z$	$20 - 5f$		$4x^4y^5 \cdot (x^5 + 9y^5z)$	$5 \cdot (4 - f)$	17
18	$48e^8f^4g^7 - 6e^4g^3$	$64 + 8e$		$6e^4g^3 \cdot (8e^4f^4g^4 - 1)$	$8 \cdot (8 + e)$	18
19	$27mp^2 + 18m^4n^4p^6$	$24 - 3mn$		$9mp^2 \cdot (3 + 2m^3n^4p^4)$	$3 \cdot (8 - mn)$	19
20	$10e^4g^6 + 14e^9fg^3$	$10ef + 12f$		$2e^4g^3 \cdot (5g^3 + 7e^5f)$	$2f \cdot (5e + 6)$	20

module IX



niv.4 : Puissances d'un quotient

Applique les propriétés des puissances.

	colonne 1	colonne 2	col1	col2	
1	$((-16b^2c^8)/(5b^8))^2$	$((-4b^6c^5)/(-12a^7))^3$	$256c^{16}/25b^{12}$	$b^{18}c^{15}/27a^{21}$	1
2	$((16bc^2)/(-7b^3))^2$	$((5a^7)/(3b^6c^6))^4$	$256c^4/49b^4$	$625a^{28}/81b^{24}c^{24}$	2
3	$((5b^3)/(7a))^2$	$((7a^4)/(7a^9c^2))^2$	$25b^6/49a^2$	$1/a^{10}c^4$	3
4	$((5b^4c^4)/(10a^9c^8))^4$	$((10a^3c^2)/(6b^3))^4$	$b^{16}/16a^{36}c^{16}$	$625a^{12}c^8/81b^{12}$	4
5	$((12a^5)/(-6b))^2$	$((-7a^5c^4)/(7b^2))^2$	$4a^{10}/b^2$	$a^{10}c^8/b^4$	5
6	$((7a^2)/(-7b^6))^3$	$((a^5)/(b^8c^8))^4$	$-1a^6/b^{18}$	$a^{20}/b^{32}c^{32}$	6
7	$((3a^4c^8)/(4b^5))^4$	$((a^6c^2)/(b^6))^2$	$81a^{16}c^{32}/256b^{20}$	$a^{12}c^4/b^{12}$	7
8	$((-6b^3)/(8b))^3$	$(3b8)/(-8a9))^3$	$-27b^6/64$	$-27b^{24}/512a^{27}$	8
9	$((4a^8)/(-6a^3c^6))^2$	$((4a^2)/(8b^8))^3$	$4a^{10}/9c^{12}$	$a^6/8b^{24}$	9
10	$((-8a^4)/(6a^9c^8))^3$	$((b^4c^7)/(a^6))^2$	$-64/27a^{15}c^{24}$	b^8c^{14}/a^{12}	10
11	$((8a^9c^9)/(8b^7c^5))^2$	$((b^7c^3)/(a^5c^4))^4$	$a^{18}c^8/b^{14}$	$b^{28}/a^{20}c^4$	11
12	$((6b^2c^5)/(6b^8))^3$	$((-14b^3c^6)/(7a^9))^2$	c^{15}/b^{18}	$4b^6c^{12}/a^{18}$	12
13	$((8a^9c^6)/(8b^9))^2$	$((-8a^3)/(-4b^9))^4$	$a^{18}c^{12}/b^{18}$	$16a^{12}/b^{36}$	13
14	$((-10b^3c^8)/(8b))^3$	$((3a^7)/(-10a^9c^3))^3$	$-125b^6c^{24}/64$	$-27/1000a^6c^9$	14
15	$((8a^5c^7)/(-8a^2))^3$	$((-6a^5c^4)/(6b^7))^2$	$-1a^9c^{21}$	$a^{10}c^8/b^{14}$	15
16	$((-14a^5c^5)/(16b^9c^3))^2$	$((-5a^5)/(16a^2c))^2$	$49a^{10}c^4/64b^{18}$	$25a^6/256c^2$	16
17	$((8a^7)/(-6a^8))^4$	$((-12b^9c^9)/(6a^5))^3$	$256/81a^4$	$-8b^{27}c^{27}/a^{15}$	17
18	$((8a^3c^8)/(12ac^9))^3$	$((-12a^5)/(-4b^8c^2))^2$	$8a^6/27c^3$	$9a^{10}/b^{16}c^4$	18
19	$((-6b^9)/(12b^3c^9))^2$	$((3b^6c^3)/(6a^7))^4$	$b^{12}/4c^{18}$	$b^{24}c^{12}/16a^{28}$	19
20	$((6b^5)/(10a^7c^5))^2$	$((3a^9c^9)/(-3ac))^4$	$9b^{10}/25a^{14}c^{10}$	$a^{32}c^{32}$	20