

3.2 Exercices

Exercice 3.1 Réduire les monômes

a) $x \cdot y \cdot z \cdot y \cdot y \cdot z \cdot y \cdot y \cdot y \cdot z \cdot x \cdot z = \underline{x^2 y^6 z^4}$

b) $(+5x^2) \cdot (2x^3) \cdot (+x^2) = \underline{10x^7}$

c) $(+7y^3) \cdot (+2xy) \cdot (-x^2y) = \underline{-14x^3y^5}$

d) $\left(\frac{3}{2}x^2y^2z\right) \cdot \left(\frac{2}{3}x^4yz^4\right) = \underline{x^6y^3z^5}$

(**Exercice 3.2**) Réduire les monômes

a) $(3xy^2)(z^3yx)(-7x^2y^2z^2) = \underline{-21x^4y^6z^5}$

b) $(-5x^6y^7z^3)(\overset{28x^2y^2z^2}{28xxyzyz})(2xyz) = \underline{-280x^9y^{10}z^6}$

Exercice 3.3 Réduire les monômes

a) $3(xy^2)^3 = \underline{3x^3y^6}$

e) $(-xy^2z^3)^3 = \underline{-x^3y^6z^9}$

b) $(3x^2y)^3 = \underline{27x^6y^3}$

f) $(-x)^{16} = \underline{x^{16}}$

c) $(-z^2y^2)^2 = \underline{y^4z^4}$

g) $(-x)^{27} = \underline{-x^{27}}$

d) $-(zy^2)^2 = \underline{-y^4z^2}$

h) $(-3x^4y^5z^6)^5 = \underline{-243x^{20}y^{25}z^{30}}$

Exercice 3.4 Réduire les monômes

a) $a^2 \cdot a^3 \cdot a = \underline{a^6}$

h) $x^2 \cdot x^4 \cdot x = \underline{x^7}$

b) $(a^2)^4 = \underline{a^8}$

i) $(a^2 \cdot b^3 \cdot c)^3 = \underline{a^6b^9c^3}$

c) $c^5 \cdot c^3 \cdot c^2 = \underline{c^{10}}$

(j) $\frac{c}{2} \cdot 20c = \underline{10c^2}$

d) $(a \cdot b^2 \cdot c)^3 = \underline{a^3b^6c^3}$

k) $\frac{y^4}{y} = \underline{y^3}$

e) $(a^2)^3 \cdot (a^4)^2 = \underline{a^6 \cdot a^8 = a^{14}}$

l) $(\sqrt{2}x) \cdot (\sqrt{2}xy) = \underline{2x^2y}$

f) $x \cdot x = \underline{x^2}$

m) $\frac{1}{\underset{1}{3}}a^4 \cdot \frac{\overset{3}{9}}{2}a^3 = \underline{\frac{3}{2}a^7}$

g) $b^5 \div b^3 = \underline{b^2}$

Exercice 3.5 Réduire les monômes

a) $(-x)^2 = \underline{x^2}$

l) $-3(3z)^2 = \underline{-27z^2}$

b) $-x^2 = \underline{-x^2}$

m) $(-2xy)^2 = \underline{4x^2y^2}$

c) $-x^2 \cdot x^2 = \underline{-x^4}$

n) $\frac{1}{5}(5xy)^2 = \underline{5x^2y^2}$

d) $+x^2 \cdot (+x^2) = \underline{x^4}$

o) $(-y)^5 = \underline{-y^5}$

e) $-(x^2)^2 = \underline{-x^4}$

p) $(2x^2y^3)^4 = \underline{16x^8y^{12}}$

f) $(-x^2)^2 = \underline{x^4}$

g) $(2xyz)^4 = \underline{16x^4y^4z^4}$

q) $\left(\frac{3}{4}x\right)^2 = \underline{\frac{9}{16}x^2}$

h) $2(xy)^4z = \underline{2x^4y^4z}$

r) $(0,5x)^3 = \underline{0,125x^3}$

i) $(-2yz)^3 = \underline{-8y^3z^3}$

s) $\left(\frac{1}{2}x^2y\right)^2 = \underline{\frac{1}{4}x^4y^2}$

j) $-2^3(yz)^2 = \underline{-8y^2z^2}$

k) $\frac{1}{8}(2yz)^3 = \underline{\frac{1}{8} \cdot 8y^3z^3 = y^3z^3}$

t) $8 \cdot \left(\frac{-5x^3}{2}\right)^2 = \underline{8 \cdot \frac{25x^6}{4} = 50x^6}$

Exercice 3.6

Quel est le coefficient des monômes ? Quel est le degré des monômes ? Quel est le degré des monômes relativement à x , y et z ?

Monôme	Coefficient	Degré du monôme	Degré en x	Degré en y	Degré en z
a) $2x^2$	2	2	2	0	0
b) $3xy$	3	2 (=1+1)	1	1	0
c) $-24y^2x$	-24	3 (=2+1)	1	2	0
d) $64x^6y^3$	64	9 (=6+3)	6	3	0
e) $-6x^4y^4z^4$	-6	12 (=4+4+4)	4	4	4
f) $\frac{3z}{10} = \frac{3}{10}z$	$\frac{3}{10}$	1	0	0	1
g) $3x - 4x = -x$	-1	1	1	0	0
h) $3\sqrt{3}$	$3\sqrt{3}$	0	0	0	0
i) $-12(xy)^5z^3$	-12	13 (=5+5+3)	5	5	3

Exercice 3.7 Associer les monômes semblables

a)

$4x$	$4x^2$	$3x^3$	$\sqrt{3}x^2$
$0,5x^2$	$-8x$	$(-2x)^4 = 16x^4$	$4x^4$
$\frac{x^4}{2}$	x	$-x^2$	$(-2x)^2 = 4x^2$
4^4	x^4	$(2x^2)^2 = 4x^4$	$\frac{x}{5} = \frac{1}{5}x$

b)

$2ab$	$-ba = -ab$	$(ab)^2 = a^2b^2$	$aab = a^2b$
a^2b	$\frac{1}{4}ab^2$	$(\sqrt{3} + \sqrt{5})a$	$\left(\frac{a}{5}\right)^4 = \frac{a^4}{625} = \frac{1}{625}a^4$
a^4	$\sqrt{2}ab$	$\frac{-a^2b}{4} = -\frac{1}{4}a^2b$	$-ab^2$
$\frac{ab}{2} = \frac{1}{2}ab$	$\frac{a^2b^2}{8} = \frac{1}{8}a^2b^2$	$2b^2$	$(0,5a^2c)^2 = 0,25a^4c^2$

Exercice 3.8 Associer les monômes semblables.

$3x$	$\frac{x^2}{2} = \frac{1}{2}x^2$	$\frac{x}{3} = \frac{1}{3}x$	$7x \cdot 3y = 21xy$
$x \cdot 3x = 3x^2$			$(0,5x)^2 = 0,25x^2$
$-x$	$2 \cdot 2x^2 = 4x^2$	$-2x^2y$	
$\sqrt{6}y$	$\frac{y}{4}(2x)^2 = \frac{1}{4}y \cdot 4x^2 = x^2y$	$4 \cdot 3xy = 12xy$	
$-5xy$	$(xy)^2 = x^2y^2$	$\frac{y}{3}(-3x) = -xy$	

Exercice 3.9

Cette maison est un cube de côté égal à $4x$.

- a) Calculer, en fonction de x , l'aire latérale de cette maison :

$$A_{\text{lat}} = 4 \cdot (4x)^2 = 4 \cdot 16x^2 = \underline{64x^2}$$

↑
aire d'une face



- b) Calculer, en fonction de x , le volume de cette maison :

$$V = (4x)^3 = \underline{64x^3}$$

Exercice 3.10

Ce conteneur est un parallélépipède rectangle dont les côtés (en cm) sont égaux à $2x^4$, $4x^2y$ et $5xy^2$.

- a) Calculer, en fonction de x et y , l'aire totale de ce conteneur :

$$\begin{aligned} A_{\text{tot}} &= 2 \cdot (2x^4 \cdot 4x^2y + 2x^4 \cdot 5xy^2 + 4x^2y \cdot 5xy^2) \\ &= 2 (8x^6y + 10x^5y^2 + 20x^3y^3) \\ &= \underline{16x^6y + 20x^5y^2 + 40x^3y^3} \quad [\text{cm}^2] \end{aligned}$$



- b) Calculer, en fonction de x et y , le volume de ce conteneur :

$$V = 2x^4 \cdot 4x^2y \cdot 5xy^2 = \underline{40x^7y^3} \quad [\text{cm}^3]$$

- c) Quelles sont les dimensions du conteneur si $x = 3$ et $y = 5$?

$$2x^4 = 2 \cdot 3^4 = 2 \cdot 81 = \underline{162 \text{ cm}}$$

$$4x^2y = 4 \cdot 3^2 \cdot 5 = 4 \cdot 9 \cdot 5 = \underline{180 \text{ cm}}$$

$$5xy^2 = 5 \cdot 3 \cdot 5^2 = 5 \cdot 3 \cdot 25 = \underline{375 \text{ cm}}$$

- d) Quel est le volume du conteneur si $x = 3$ et $y = 5$?

$$\begin{aligned} V &= 162 \cdot 180 \cdot 375 && \text{ou} && 40 \cdot 3^7 \cdot 5^3 = \underline{10'935'000 \text{ cm}^3} \\ &&& && = \underline{10,935 \text{ m}^3} \end{aligned}$$

Exercice 3.11 Somme de monômes

$$a) 7x + 9x - 10x - 20x = (7+9-10-20)x = \underline{-14x}$$

$$b) -14y^2 - 9y^2 + 12y^2 + 10y^2 = (-14-9+12+10)y^2 = \underline{-y^2}$$

$$c) -4xy^2 + 29xy^2 - 27xy^2 + 61xy^2 - 18xy^2 = (-4+29-27+61-18)xy^2 = \underline{41xy^2}$$

$$d) 15x^2y^2 + (-19x^2y^2) + (-11x^2y^2) + 14x^2y^2 + (-29x^2y^2) = (15-19-11+14-29)x^2y^2 = \underline{-30x^2y^2}$$

Exercice 3.12 Somme de monômes

$$a) 8x - (24x - 5x) = 8x - 19x = \underline{-11x}$$

$$b) 12y - (-8y + 7y - 3y) = 12y - (-4y) = 12y + 4y = \underline{16y}$$

$$c) x - [3x - (2x - 5x)] = x - [3x - (-3x)] = x - (3x + 3x) = x - 6x = \underline{-5x}$$

$$d) 3x - \{2x - [4x - (5x - 8x)]\} = 3x - \{2x - [4x - (-3x)]\} = 3x - \{2x - 7x\} \\ = 3x - (-5x) = 3x + 5x = \underline{8x}$$

Exercice 3.13 Somme de polynômes

$$a) 4x^2 - 5 + 3x^2 - 1 = (4+3)x^2 + (-5-1) = \underline{7x^2 - 6}$$

$$b) 6 + x^3 + 2 - x^3 = (1-1)x^3 + (6+2) = 0x^3 = \underline{8}$$

$$c) 5x^2 + 9y^2 - 4y^2 + x^2 = (5+1)x^2 + (9-4)y^2 = \underline{6x^2 + 5y^2}$$

$$d) 6x^2 - 5xy + 5x^2 - 6xy = (6+5)x^2 + (-5-6)xy = \underline{11x^2 - 11xy}$$

$$e) \underbrace{(x^3 - 5x^2 + 7)}_{\text{inutile}} + \underbrace{(3x + x^3 - 1)}_{\text{car } \pm \text{ devant}} = (1+1)x^3 - 5x^2 + 3x + (7-1) = \underline{2x^3 - 5x^2 + 3x + 6}$$

$$f) \underbrace{(4x^4 - 5x^3 + 6x^2 - 1)}_{\text{car } \pm \text{ devant}} + \underbrace{(3x^4 + 4x^2 - 5)}_{\text{car } \pm \text{ devant}} = (4+3)x^4 - 5x^3 + (6+4)x^2 + (-1-5) \\ = \underline{7x^4 - 5x^3 + 10x^2 - 6}$$

Exercice 3.14 Différence de polynômes

$$a) (5x + y) - (5x + y) = \underline{0}$$

$$b) (5x + 3y) - (7x + 3y + z) = \underline{5x + 3y - 7x - 3y - z} = \underline{-2x - z}$$

$$c) (-19x - 5y + 1) - (4x - 2y - 3) = \underline{-19x - 5y + 1 - 4x + 2y + 3} = \underline{-23x - 3y + 4}$$

$$d) (4x^4 + 2x^3 + x^2) - (5x^3 + 5x^2 + x - 7) = \underline{4x^4 + 2x^3 + x^2 - 5x^3 - 5x^2 - x + 7}$$

$$= \underline{4x^4 - 3x^3 - 4x^2 - x + 7}$$

Exercice 3.15 Calcul polynomial

$$a) 16x - y - (3x - y) + (4x - 1) - (x + y) = \underline{16x - y - 3x + y + 4x - 1 - x - y}$$

$$= \underline{16x - y - 1}$$

$$b) 20x - [16x - (2x + y)] = \underline{20x - (16x - 2x - y)} = \underline{20x - (14x - y)} = \underline{20x - 14x + y}$$

$$= \underline{6x + y}$$

$$c) 6x^2 - [15x - (3x^2 - 9x)] = \underline{6x^2 - (15x - 3x^2 + 9x)} = \underline{6x^2 - (24x - 3x^2)}$$

$$= \underline{6x^2 - 24x + 3x^2} = \underline{9x^2 - 24x}$$

() inutile

$$d) (4x^2 - 3xy + 8y^2) + (-3x^2 + 3xy - 9y^2) = \underline{x^2 - y^2}$$

$$e) 12x - 4y - (6x - 4y) - [(3x + 4y) - (2x + 9y)] = \underline{12x - 4y - 6x + 4y - (3x + 4y - 2x - 9y)}$$

$$= \underline{6x - (x - 5y)} = \underline{6x - x + 5y} = \underline{5x + 5y}$$

Exercice 3.16 Produit de polynômes

$$a) 4(x + 1) = \underline{4x + 4}$$

$$d) -1(-x + y) = \underline{x - y}$$

$$b) 3(x - y) = \underline{3x - 3y}$$

$$e) (2x + 3y - 5z)(-1) = \underline{-2x - 3y + 5z}$$

$$c) -1(x - y) = \underline{-x + y}$$

$$f) (-1)(3x^2 - 2x - 5) = \underline{-3x^2 + 2x + 5}$$

Exercice 3.17 Produit de polynômes

$$a) \quad x(x^2 + 2x - 1) = \underline{x^3 + 2x^2 - x}$$

$$b) \quad (-3z + 8) \cdot 21x^2 = \underline{-63x^2z + 168x^2}$$

$$c) \quad -x^2(2x + 5x^2 - x^3) = -2x^3 - 5x^4 + x^5 = \underline{x^5 - 5x^4 - 2x^3}$$

$$d) \quad (-4xz^3 - 5x^3z)(-xz^3) = \underline{4x^2z^6 + 5x^4z^4}$$

Exercice 3.18 Réduire les produits de polynômes

$$a) \quad (2x - 5)(3y - 7) = \underline{6xy - 14x - 15y + 35}$$

$$b) \quad (15x - 1)(2z + 12) = \underline{30xz + 180x - 2z - 12}$$

$$c) \quad (-3x - 2y)(-x - y) = 3x^2 + 3xy + 2xy + 2y^2 = \underline{3x^2 + 5xy + 2y^2}$$

$$d) \quad (y^2 - 1)(y^4 + 1) = \underline{y^6 + y^2 - y^2 - 1}$$

Exercice 3.19 Réduire les produits de polynômes

$$a) \quad (x^2 - 2x)(3x - 1) = 3x^3 - x^2 - 6x^2 + 2x = \underline{3x^3 - 7x^2 + 2x}$$

$$b) \quad (3y - 1)(4y^2 - 5y + 6) = 12y^3 - 15y^2 + 18y - 4y^2 + 5y - 6 = \underline{12y^3 - 19y^2 + 23y - 6}$$

$$c) \quad (x^2 + x - 3)(x^2 - 2x + 1) = x^4 - 2x^3 + x^2 + x^3 - 2x^2 + x - 3x^2 + 6x - 3 \\ = \underline{x^4 - x^3 - 4x^2 + 7x - 3}$$

$$d) \quad (x - y)(x + y)(x - z) = (x^2 + xy - xy - y^2)(x - z) = (x^2 - y^2)(x - z) \\ = \underline{x^3 - x^2z - xy^2 + y^2z}$$

$$e) \quad (2x + 1)(3x - 1)(5x + 2) = (6x^2 - 2x + 3x - 1)(5x + 2) = (6x^2 + x - 1)(5x + 2) \\ = 30x^3 + 12x^2 + 5x^2 + 2x - 5x - 2 = \underline{30x^3 + 17x^2 - 3x - 2}$$

Exercice 3.20 Réduire les produits de polynômes

$$\begin{aligned} \text{a) } 3x(x-y)(x+2y) &= (3x^2 - 3xy)(x+2y) = 3x^3 + 6x^2y - 3x^2y - 6xy^2 \\ &= \underline{3x^3 + 3x^2y - 6xy^2} \end{aligned}$$

$$\begin{aligned} \text{b) } -5xy(2x+3y)(4x+1) &= (-10x^2y - 15xy^2)(4x+1) \\ &= \underline{-40x^3y - 10x^2y - 60x^2y^2 - 15xy^2} \end{aligned}$$

$$\begin{aligned} \text{c) } (2-x)(3+x)(7x+1) &= (6+2x-3x-x^2)(7x+1) = (6-x-x^2)(7x+1) \\ &= \underline{42x+6-7x^2-x-7x^3-x^2} = \underline{-7x^3-8x^2+41x+6} \end{aligned}$$

Exercice 3.21

Placer dans le un monôme afin que l'égalité soit vérifiée.

$$\text{a) } x^3 \cdot \boxed{x^2} = x^4 \cdot x = x^5$$

$$\text{c) } 5k^{12}x^3 \cdot \boxed{\frac{1}{5}} \cdot 2kx = 2k^{13}x^4$$

$$\text{b) } \underbrace{4m^3n^2 \cdot 6m^4}_{24m^7n^2} = \boxed{3m^6n} \cdot 8mn$$

$$\text{d) } \underbrace{(x^2y)^3}_{x^6y^3} \cdot \left(\underbrace{\boxed{xy^3}}_{x^2y^6} \right)^2 = (xy)^8 \cdot y = x^8y^9$$

(Exercice 3.22) Calcul polynomial

$$\text{a) } \frac{4}{3}x^2y - x^2y + \frac{5}{2}x^2y =$$

$$\text{b) } \frac{5}{6}a^3 - a\left(\frac{1}{2}a^2 - \frac{5}{4}ab\right) + \frac{3}{4}a^2b =$$

$$\text{c) } \left(\frac{x^2}{2} - 2\right)\left(\frac{x}{3} - 1\right) =$$

$$\text{d) } \left(\frac{x^3}{2} - \frac{x^2}{4}\right) - \left[\frac{x}{3}\left(\frac{x^2}{2} - \frac{3x}{4}\right)\right] =$$

Exercice 3.23

a) $(6x - 5y)(3x + 4y) - (9x + 2y)(2x - 3y) - 2y(7y - 16x) =$

b) $(6x \cdot 5y)(3x \cdot 4y) - (9x + 2y)(2x \cdot 3y) - 2y(7y \cdot 16x) =$

c) $(8x - 3y)(2x \cdot 4y) - (8x \cdot 3y) \cdot (2x \cdot 4y) =$

d) $-(xy - y^2) + x(x - y)y - y^2 - [xy(xy) - (x - y)(x + y)] =$

Exercice 3.24 Calculer

$$\text{a) } \frac{5}{x} \cdot \frac{4}{x} = \frac{20}{x^2}$$

$$\text{i) } \frac{3}{1} + \frac{4}{x} = \frac{3x}{x} + \frac{4}{x} = \frac{3x+4}{x}$$

$$\text{b) } \frac{5}{x^2} \cdot \left(\frac{2}{x}\right)^3 = \frac{5}{x^2} \cdot \frac{8}{x^3} = \frac{40}{x^5}$$

$$\text{j) } \frac{3}{x^2} + \frac{4}{x} = \frac{3}{x^2} + \frac{4x}{x^2} = \frac{4x+3}{x^2}$$

$$\text{c) } \frac{3}{1} \cdot \frac{4}{x} = \frac{12}{x}$$

$$\text{k) } \frac{5}{x^3} - \frac{3}{x^2} + \frac{1}{x} = \frac{5}{x^3} - \frac{3x}{x^3} + \frac{x^2}{x^3} = \frac{x^2 - 3x + 5}{x^3}$$

$$\text{d) } \frac{3}{x} \cdot \frac{x}{5} = \frac{3}{5}$$

$$\text{l) } \frac{4}{5x} - \frac{7}{6x} = \frac{24}{30x} - \frac{35}{30x} = -\frac{11}{30x}$$

$$\text{e) } 3 \div \frac{5}{x} = \frac{3}{1} \cdot \frac{x}{5} = \frac{3x}{5}$$

$$\text{f) } \frac{5}{1} \cdot \frac{x-2}{x} = \frac{5(x-2)}{x} = \frac{5x-10}{x}$$

$$\begin{aligned} \text{m) } 3 \cdot \frac{x-2}{x} - (x-3) \cdot \frac{5}{x} &= \frac{3(x-2)}{x} - \frac{5(x-3)}{x} \\ &= \frac{3(x-2) - 5(x-3)}{x} = \frac{3x-6-5x+15}{x} \\ &= \frac{-2x+9}{x} \end{aligned}$$

$$\text{g) } \frac{x^2}{3} \cdot \frac{9}{x^4} = \frac{3}{x^2}$$

$$\text{h) } \frac{5}{x} + \frac{4}{x} = \frac{5+4}{x} = \frac{9}{x}$$

$$\begin{aligned} \text{n) } \frac{x^2}{1} \cdot \frac{x}{x^3} - (x+2) \cdot \frac{5}{2x} &= \frac{1}{1} - \frac{5(x+2)}{2x} \\ &= \frac{2x - 5(x+2)}{2x} = \frac{2x - 5x - 10}{2x} \\ &= \frac{-3x - 10}{2x} \end{aligned}$$

3.3 Solutions des exercices

3.1 a) $x^2y^6z^4$ b) $10x^7$ c) $-14x^3y^5$ d) $x^6y^3z^5$

3.2 a) $-21x^4y^5z^5$ b) $-280x^9y^{10}z^6$

3.3

a) $3x^3y^6$ c) y^4z^4 e) $-x^3y^6z^9$ g) $-x^{27}$
 b) $27x^6y^3$ d) $-y^4z^2$ f) x^{16} h) $-243x^{20}y^{25}z^{30}$

3.4

a) a^6 e) a^{14} i) $a^6b^9c^3$ m) $\frac{3}{2}a^7 = \frac{3a^7}{2}$
 b) a^8 f) x^2 j) $10c^2$
 c) c^{10} g) b^2 k) y^3
 d) $a^3b^6c^3$ h) x^7 l) $2x^2y$

3.5

a) x^2 f) x^4 k) y^3z^3 p) $16x^8y^{12}$
 b) $-x^2$ g) $16x^4y^4z^4$ l) $-27z^2$ q) $\frac{9}{16}x^2$
 c) $-x^4$ h) $2x^4y^4z$ m) $4x^2y^2$ r) $0,125x^3$
 d) x^4 i) $-8y^3z^3$ n) $5x^2y^2$ s) $\frac{1}{4}x^4y^2$
 e) $-x^4$ j) $-8y^2z^2$ o) $-y^5$ t) $50x^6$

3.6

Monôme	Coefficient	Degré du monôme	Degré en x	Degré en y	Degré en z
a) $2x^2$	2	2	2	0	0
b) $3xy$	3	2	1	1	0
c) $-24y^2x$	-24	3	1	2	0
d) $64x^6y^3$	64	9	6	3	0
e) $-6x^4y^4z^4$	-6	12	4	4	4
f) $\frac{3z}{10}$	$\frac{3}{10} = 0,3$	1	0	0	1
g) $3x - 4x$	-1	1	1	0	0
h) $3\sqrt{3}$	$3\sqrt{3}$	0	0	0	0
i) $-12(xy)^5z^3$	-12	13	5	5	3

3.7

a) $4x, -8x, x, \frac{x}{5}$ sont semblables

$0,5x^2, 4x^2, -x^2, \sqrt{3}x^2, (-2x)^2$ sont semblables

$\frac{x^4}{2}, x^4, (-2x)^4, (2x^2)^2, 4x^4$ sont semblables

b) $2ab, \frac{ab}{2}, -ba, \sqrt{2}ab$ sont semblables

$a^2b, aab, \frac{-a^2b}{4}$ sont semblables

$\frac{1}{4}ab^2, -ab^2$ sont semblables

$(ab)^2, \frac{a^2b^2}{8}$ sont semblables

$a^4, \left(\frac{a}{5}\right)^4$ sont semblables

3.8

$3x$ $\frac{x^2}{2}$ $\frac{x}{3}$ $7x \cdot 3y$
 $x \cdot 3x$ $(0,5x)^2$
 $-x$ $2 \cdot 2x^2$ $-2x^2y$
 $\sqrt{6}y$ $\frac{y}{4}(2x)^2$ $4 \cdot 3xy$
 $-5xy$ $(xy)^2$ $\frac{y}{3}(-3x)$

3.9

a) $64x^2$

b) $64x^3$

3.10

a) $16x^6y + 20x^5y^2 + 40x^3y^3 \text{ cm}^2$

c) $162 \times 180 \times 375 \text{ cm}$

b) $40x^7y^3 \text{ cm}^3$

d) $10'935'000 \text{ cm}^3 = 10,935 \text{ m}^3$

3.11

- a) $-14x$ b) $-y^2$ c) $41xy^2$ d) $-30x^2y^2$

3.12

- a) $-11x$ b) $16y$ c) $-5x$ d) $8x$

3.13

- a) $7x^2 - 6$ c) $6x^2 + 5y^2$ e) $2x^3 - 5x^2 + 3x + 6$
b) 8 d) $11x^2 - 11xy$ f) $7x^4 - 5x^3 + 10x^2 - 6$

3.14

- a) 0 c) $-23x - 3y + 4$
b) $-2x - z$ d) $4x^4 - 3x^3 - 4x^2 - x + 7$

3.15

- a) $16x - y - 1$ d) $x^2 - y^2$
b) $6x + y$ e) $5x + 5y$
c) $9x^2 - 24x$

3.16

- a) $4x + 4$ c) $-x + y$ e) $-2x - 3y + 5z$
b) $3x - 3y$ d) $x - y$ f) $-3x^2 + 2x + 5$

3.17

- a) $x^3 + 2x^2 - x$ c) $x^5 - 5x^4 - 2x^3$
b) $-63x^2z + 168x^2$ d) $4x^2z^6 + 5x^4z^4$

3.18

- a) $6xy - 14x - 15y + 35$ c) $3x^2 + 5xy + 2y^2$
b) $30xz + 180x - 2z - 12$ d) $y^6 - y^4 + y^2 - 1$

3.19

a) $3x^3 - 7x^2 + 2x$

d) $x^3 - x^2z - xy^2 + y^2z$

b) $12y^3 - 19y^2 + 23y - 6$

e) $30x^3 + 17x^2 - 3x - 2$

c) $x^4 - x^3 - 4x^2 + 7x - 3$

3.20

a) $3x^3 + 3x^2y - 6xy^2$

c) $-7x^3 - 8x^2 + 41x + 6$

b) $-40x^3y - 10x^2y - 60x^2y^2 - 15xy^2$

3.21

a) $x^3 \cdot \boxed{x^2} = x^4 \cdot x$

c) $5k^{12}x^3 \cdot \boxed{\frac{1}{5}} \cdot 2kx = 2k^{13}x^4$

b) $4m^3n^2 \cdot 6m^4 = \boxed{3m^6n} \cdot 8mn$

d) $(x^2y)^3 \cdot \left(\boxed{xy^3}\right)^2 = (xy)^8 \cdot y$

3.22

a) $\frac{17}{6}x^2y$

c) $\frac{1}{6}x^3 - \frac{1}{2}x^2 - \frac{2}{3}x + 2$

b) $\frac{1}{3}a^3 + 2a^2b$

d) $\frac{1}{3}x^3$

3.23

a) $-28y^2 + 64xy$

c) $-192x^2y^2 + 64x^2y - 24xy^2$

b) $360x^2y^2 - 54x^2y - 236xy^2$

d) $-x^2y^2 + x^2y - xy^2 - xy + x^2 - y^2$

3.24

a) $\frac{20}{x^2}$

e) $\frac{3x}{5}$

i) $\frac{3x+4}{x}$

l) $-\frac{11}{30x}$

b) $\frac{40}{x^5}$

f) $\frac{5x-10}{x}$

j) $\frac{4x+3}{x^2}$

m) $\frac{-2x+9}{x}$

c) $\frac{12}{x}$

g) $\frac{3}{x^2}$

k) $\frac{x^2-3x+5}{x^3}$

n) $\frac{-3x-10}{2x}$

d) $\frac{3}{5}$

h) $\frac{9}{x}$