Correction : factoriser une expression

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Exercice 1 (Avec un facteur commun)

a) $A(x) = 4x^2 - 3x$

$\boxed{A(x) = x(4x-3)}$.

b) $B(x) = x(x-1) + (4-3x)(x-1)$

$B(x) = (x-1)[x + (4-3x)]$

$B(x) = (x-1)(x+4-3x)$

$\boxed{B(x) = (x-1)(-2x+4)}$.

On peut factoriser davantage :

$B(x) = (x-1) \times 2(-x+2)$

$\boxed{B(x) = 2(x-1)(2-x)}$.

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

$C(x) = (2x+1)(5-x) + (2x+1)(2x+1)$

$C(x) = (2x+1)[(5-x) + (2x+1)]$

$C(x) = (2x+1)(5-x+2x+1)$

$\boxed{C(x) = (2x+1)(x+6)}$.

d) $D(x) = (3x+5)(2x-1) - (7-2x)(2x-1)$

$D(x) = (2x-1)[(3x+5) - (7-2x)]$

$D(x) = (2x-1)(3x+5-7+2x)$

$\boxed{D(x) = (2x-1)(5x-2)}$.

e) $E(x) = (5x-3) + (2-7x)(5x-3)$

$E(x) = \mathbf{1}(5x-3) + (2-7x)(5x-3)$

$E(x) = (5x-3)[\mathbf{1} + (2-7x)]$

$E(x) = (5x-3)(1+2-7x)$

$\boxed{E(x) = (5x-3)(3-7x)}$.

f) $F(x) = (2x-3)(x+4) - (x+4)(3-4x)$

$F(x) = (x+4)[(2x-3) - (3-4x)]$

$F(x) = (x+4)(2x-3-3+4x)$

$\boxed{F(x) = (x+4)(6x-6)}$.

On peut factoriser davantage :

$F(x) = (x+4) \times 6(x-1)$

$\boxed{F(x) = 6(x+4)(x-1)}$.

Exercice 2 (Avec la 1ère identité remarquable)

a) $a(x) = x^2 + 8x + 16$

$a(x) = x^2 + 2 \times x \times 4 + 4^2$

$\boxed{a(x) = (x+4)^2}$.

b) $b(x) = 25x^2 + 30x + 9$

$b(x) = (5x)^2 + 2 \times 5x \times 3 + 3^2$

$\boxed{b(x) = (5x+3)^2}$.

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

$c(x) = (2x)^2 + 2 \times 2x \times 1 + 1^2$

$\boxed{c(x) = (2x+1)^2}$.

Exercice 3 (Avec la 2ème identité remarquable)

a) $d(x) = 9x^2 - 12x + 4$

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

$\boxed{d(x) = (3x-2)^2}$.

b) $e(x) = x^2 - 10x + 25$

$e(x) = x^2 - 2 \times x \times 5 + 5^2$

$\boxed{e(x) = (x-5)^2}$.

c) $f(x) = 16x^2 - 56x + 49$

$f(x) = (4x)^2 - 2 \times 4x \times 7 + 7^2$

$\boxed{f(x) = (4x-7)^2}$.

Exercice 4 (Avec la 3ème identité remarquable)

a) $g(x) = x^2 - 81$

$g(x) = x^2 - 9^2$

$\boxed{g(x) = (x+9)(x-9)}$.

b) $h(x) = 4x^2 - 25$

$h(x) = (2x)^2 - 5^2$

$\boxed{h(x) = (2x+5)(2x-5)}$.

c) $i(x) = 36 - 9x^2$

$i(x) = 6^2 - (3x)^2$

$i(x) = (6+3x)(6-3x)$

$\boxed{i(x) = (3x+6)(6-3x)}$.

On peut factoriser davantage :

$i(x) = 3(x+2) \times 3(2-x)$

$\boxed{i(x) = 9(x+2)(2-x)}$.

d) $j(x) = (2x-1)^2 - 49$

$j(x) = (2x-1)^2 - 7^2$

$j(x) = [(2x-1)+7][(2x-1)-7]$

$j(x) = (2x-1+7)(2x-1-7)$

$\boxed{j(x) = (2x+6)(2x-8)}$.

On peut factoriser davantage :

$j(x) = 2(x+3) \times 2(x-4)$

$\boxed{j(x) = 4(x+3)(x-4)}$.

e) $k(x) = 64 - (5x-3)^2$

$k(x) = 8^2 - (5x-3)^2$

$k(x) = [8+(5x-3)][8-(5x-3)]$

$k(x) = (8+5x-3)(8-5x+3)$

$\boxed{k(x) = (5x+5)(11-5x)}$.

On peut factoriser davantage :

$\boxed{k(x) = 5(x+1)(11-5x)}$.

f) $l(x) = (x+4)^2 - (3-4x)^2$

$l(x) = [(x+4)+(3-4x)][(x+4)-(3-4x)]$

$l(x) = (x+4+3-4x)(x+4-3+4x)$

$\boxed{l(x) = (7-3x)(5x+1)}$.

✎ Exercice 5 (Tout mélangé !)

a) $G(x) = 64x^2 - 16x + 1$

$G(x) = (8x)^2 - 2 \times 8x \times 1 + 1^2$

$\boxed{G(x) = (8x-1)^2}$.

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

$H(x) = (5x-2)[(4x+3)-(3x-1)]$

$H(x) = (5x-2)(4x+3-3x+1)$

$\boxed{H(x) = (5x-2)(x+4)}$.

c) $I(x) = 49x^2 - 36$

$I(x) = (7x)^2 - 6^2$

$\boxed{I(x) = (7x+6)(7x-6)}$.

d) $J(x) = 25 - (2x+3)^2$

$J(x) = 5^2 - (2x+3)^2$

$J(x) = [5+(2x+3)][5-(2x+3)]$

$J(x) = (5+2x+3)(5-2x-3)$

$\boxed{J(x) = (2x+8)(2-2x)}$.

On peut factoriser davantage :

$J(x) = 2(x+4) \times 2(1-x)$

$\boxed{J(x) = 4(x+4)(1-x)}$.

e) $K(x) = 4x^2 + 12x + 9$

$K(x) = (2x)^2 + 2 \times 2x \times 3 + 3^2$

$\boxed{K(x) = (2x+3)^2}$.

f) $L(x) = (2x-3)^2 + (2x-3)(1-4x)$

$L(x) = (2x-3)(2x-3) + (2x-3)(1-4x)$

$L(x) = (2x-3)[(2x-3)+(1-4x)]$

$L(x) = (2x-3)(2x-3+1-4x)$

$\boxed{L(x) = (2x-3)(-2x-2)}$.

On peut factoriser davantage :

$L(x) = (2x-3) \times (-2) \times (x+1)$

$\boxed{L(x) = -2(2x-3)(x+1)}$.

g) $M(x) = (4-3x)^2 - (5x-2)^2$

$M(x) = [(4-3x)+(5x-2)][(4-3x)-(5x-2)]$

$M(x) = (4-3x+5x-2)(4-3x-5x+2)$

$\boxed{M(x) = (2x+2)(6-8x)}$.

On peut factoriser davantage :

$M(x) = 2(x+1) \times 2(3-4x)$

$\boxed{M(x) = 4(x+1)(3-4x)}$.

h) $N(x) = (5x+1)(2x+3) - (5x+1)$

$N(x) = (5x+1)(2x+3) - \mathbf{1}(5x+1)$

$N(x) = (5x+1)[(2x+3) - \mathbf{1}]$

$N(x) = (5x+1)(2x+3-1)$

$\boxed{N(x) = (5x+1)(2x+2)}$.

On peut factoriser davantage :

$N(x) = (5x+1) \times 2(x+1)$

$\boxed{N(x) = 2(5x+1)(x+1)}$.