## EXERCICE 1B.1

Développer les expressions suivantes à l'aide d'une identité remarquable :

| | | | |
|---|---|---|---|
| **a.** | $(x + 3)^2 =$ | **b.** | $(x - 4)^2 =$ |
| **c.** | $(2x + 1)^2 =$ | **d.** | $(2x - 3)^2 =$ |
| **e.** | $(3x - 5)^2 =$ | **f.** | $(6x + 1)^2 =$ |
| **g.** | $(7x + 2)^2 =$ | **h.** | $(4x - 7)^2 =$ |

## EXERCICE 1B.2

Factoriser les expressions suivantes à l'aide d'une identité remarquable :

| | | | |
|---|---|---|---|
| **a.** | $x^2 + 10x + 25 =$ | **b.** | $x^2 - 2x + 1 =$ |
| **c.** | $4x^2 - 20x + 25 =$ | **d.** | $4x^2 + 12x + 9 =$ |
| **e.** | $x^2 + 6x + 9 =$ | **f.** | $36x^2 - 12x + 1 =$ |
| **g.** | $x^2 + 24x + 144 =$ | **h.** | $9x^2 - 18x + 9 =$ |

## EXERCICE 1B.3

Compléter l'expression pour ensuite la factoriser à l'aide d'une identité remarquable :

| | | | |
|---|---|---|---|
| **a.** | $x^2 + 4x + \ldots\ldots =$ | **b.** | $x^2 - \ldots\ldots + 16 =$ |
| **c.** | $\ldots\ldots - 10x + 25 =$ | **d.** | $4x^2 + 4x + \ldots\ldots =$ |
| **e.** | $9x^2 + \ldots\ldots + 25 =$ | **f.** | $\ldots\ldots - 8x + 4 =$ |
| **g.** | $x^2 + 14x + \ldots\ldots =$ | **h.** | $x^2 + 18x + \ldots\ldots =$ |

## EXERCICE 1B.4

Ecrire sous forme canonique les expressions suivantes comme dans l'exemple :

| | |
|---|---|
| **A$(x)$ = $x^2$ + 6$x$ + 5**<br>   = $x^2$ + $\underline{2 \times 3 \times x}$ + 5<br>   = ($x^2$ + $2 \times 3 \times x$ $\underline{+ 3^2) - 3^2}$ + 5<br>   = ($x$ + 3)² − $\underline{9}$ + 5<br>   = $\boxed{(x + 3)^2 - 4}$ | B$(x) = x^2 + 8x + 3$ |
| C$(x) = x^2 - 10x + 9$ | D$(x) = x^2 + 2x + 7$ |
| E$(x) = x^2 - 5x - 1$ | |
| F$(x) = x^2 + 7x + 3$ | G$(x) = 2x^2 - 12x + 8$ |
| H$(x) = 3x^2 + 15x - 7$ | |

**CORRIGE – NOTRE DAME DE LA MERCI - MONTPELLIER**

**EXERCICE 1B.1** $(a+b)^2 = a^2 + 2ab + b^2$ $(a-b)^2 = a^2 - 2ab + b^2$

| | |
|---|---|
| $(x+3)^2 = x^2 + 2 \times x \times 3 + 3^2 = x^2 + 6x + 9$ | $(x-4)^2 = x^2 - 2 \times x \times 4 + 4^2 = x^2 - 8x + 16$ |
| $(2x+1)^2 = (2x)^2 + 2 \times 2x \times 1 + 1^2 = 4x^2 + 4x + 1$ | $(2x-3)^2 = (2x)^2 - 2 \times 2x \times 3 + 3^2 = 4x^2 - 12x + 9$ |
| $(3x-5)^2 = (3x)^2 - 2 \times 3x \times 5 + 5^2 = 9x^2 - 30x + 25$ | $(6x+1)^2 = (6x)^2 + 2 \times 6x \times 1 + 1^2 = 36x^2 + 12x + 1$ |
| $(7x+2)^2 = (7x)^2 + 2 \times 7x \times 2 + 2^2 = 49x^2 + 28x + 4$ | $(4x-7)^2 = (4x)^2 - 2 \times 4x \times 7 + 7^2 = 16x^2 - 56x + 49$ |

**EXERCICE 1B.2** $a^2 + 2ab + b^2 = (a+b)^2$ $a^2 - 2ab + b^2 = (a-b)^2$

| | |
|---|---|
| $x^2 + 10x + 25 = x^2 + 2 \times x \times 5 + 5^2 = (x+5)^2$ | $x^2 - 2x + 1 = x^2 - 2 \times x \times 1 + 1^2 = (x-1)^2$ |
| $4x^2 - 20x + 25 = (2x)^2 - 2 \times 2x \times 5 + 5^2 = (2x-5)^2$ | $4x^2 + 12x + 9 = (2x)^2 + 2 \times 2x \times 3 + 3^2 = (2x+3)^2$ |
| $x^2 + 6x + 9 = x^2 + 2 \times x \times 3 + 3^2 = (x+3)^2$ | $36x^2 - 12x + 1 = (6x)^2 - 2 \times 6x \times 1 + 1^2 = (6x-1)^2$ |
| $x^2 + 24x + 144 = x^2 + 2 \times x \times 12 + 12^2 = (x+12)^2$ | $9x^2 - 18x + 9 = (3x)^2 - 2 \times 3x \times 3 + 3^2 = (3x-3)^2$ |

**EXERCICE 1B.3** Compléter l'expression pour ensuite la factoriser à l'aide d'une identité remarquable :

| | |
|---|---|
| $x^2 + 4x + \mathbf{4} = x^2 + 2 \times x \times 2 + 2^2 = (x+2)^2$ | $x^2 - \mathbf{8x} + 16 = x^2 - 2 \times x \times 4 + 4^2 = (x-4)^2$ |
| $\mathbf{x^2} - 10x + 25 = x^2 - 2 \times x \times 5 + 5^2 = (x-5)^2$ | $4x^2 + 4x + \mathbf{1} = (2x)^2 + 2 \times 2x \times 1 + 1^2 = (2x+1)^2$ |
| $9x^2 - \mathbf{30x} + 25 = (3x)^2 - 2 \times 3x \times 5 + 5^2 = (3x-5)^2$ | $\mathbf{4x^2} - 8x + 4 = (2x)^2 - 2 \times 2x \times 2 + 2^2 = (x-2)^2$ |
| $x^2 + 14x + \mathbf{49} = x^2 + 2 \times x \times 7 + 7^2 = (x+7)^2$ | $x^2 + 18x + \mathbf{81} = x^2 + 2 \times x \times 9 + 9^2 = (x+9)^2$ |

**EXERCICE 1B.4** Ecrire sous forme canonique les expressions suivantes comme dans l'exemple :

| | |
|---|---|
| $\mathbf{A}(x)$ $= x^2 + 6x + 5$<br> $= x^2 + \mathbf{2 \times 3 \times x} + 5$<br> $= (x^2 + \mathbf{2 \times 3 \times x + 3^2}) - 3^2 + 5$<br> $= (x + 3)^2 - \mathbf{9} + 5$<br> $= \boxed{(x + 3)^2 - 4}$ | $B(x) = x^2 + 8x + 3$<br><br> $B(x) = x^2 + \mathbf{2 \times x \times 4} + 3$<br><br> $B(x) = (x^2 + 2 \times x \times 4 + \mathbf{4^2}) - \mathbf{4^2} + 3$<br><br> $B(x) = (x+4)^2 - 9 + 3$<br><br> $B(x) = (x+4)^2 - 6$ |
| $C(x) = x^2 - 10x + 9$<br> $C(x) = x^2 - \mathbf{2 \times x \times 5} + 9$<br> $C(x) = (x^2 - 2 \times x \times 5 + \mathbf{5^2}) - \mathbf{5^2} + 9$<br> $C(x) = (x-5)^2 - 25 + 9$<br> $C(x) = (x-5)^2 - 16$<br> $C(x) = (x-5)^2 - 4^2$<br> $C(x) = (x-1)(x-9)$ | $D(x) = x^2 + 2x + 7$<br> $D(x) = x^2 + \mathbf{2 \times x \times 1} + 7$<br> $D(x) = (x^2 + 2 \times x \times 1 + \mathbf{1^2}) - \mathbf{1^2} + 7$<br> $D(x) = (x+1)^2 - 1 + 7$<br> $D(x) = (x+1)^2 + 6$ |

$E(x) = x^2 - 5x - 1$

$E(x) = x^2 - \mathbf{2 \times x \times \dfrac{5}{2}} - 1$

$E(x) = \left( x^2 - 2 \times x \times \dfrac{5}{2} + \left(\dfrac{5}{2}\right)^2 \right) - \left(\dfrac{5}{2}\right)^2 - 1$

$E(x) = \left( x - \dfrac{5}{2} \right)^2 - \dfrac{25}{4} - 1$

$E(x) = \left( x - \dfrac{5}{2} \right)^2 - \dfrac{29}{4}$

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$F(x) = x^2 + 7x + 3$

$F(x) = x^2 + \mathbf{2 \times x \times \dfrac{7}{2}} + 3$

$F(x) = \left( x^2 + 2 \times x \times \dfrac{7}{2} + \left(\dfrac{7}{2}\right)^2 \right) - \left(\dfrac{7}{2}\right)^2 + 3$

$F(x) = \left( x + \dfrac{7}{2} \right)^2 - \dfrac{49}{4} + 3$

$F(x) = \left( x - \dfrac{5}{2} \right)^2 - \dfrac{37}{4}$

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$G(x) = 2x^2 - 12x + 8$

$G(x) = 2\left( x^2 - 6x + 4 \right)$

$G(x) = 2\left( x^2 - \mathbf{2 \times x \times 3} + 4 \right)$

$G(x) = 2\left[ \left( x^2 - 2 \times x \times 3 + \mathbf{3^2} \right) - \mathbf{3^2} + 4 \right]$

$G(x) = 2\left[ (x-3)^2 - 9 + 4 \right]$

$G(x) = 2\left[ (x-3)^2 - 5 \right]$

$G(x) = 2\left[ (x-3)^2 - \left(\sqrt{5}\right)^2 \right]$

$G(x) = 2\left[ \left( x - 3 + \sqrt{5} \right)\left( x - 3 - \sqrt{5} \right) \right]$

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$H(x) = 3x^2 + 15x - 7$

$H(x) = 3\left( x^2 + 5x - \dfrac{7}{3} \right)$

$H(x) = 3\left( x^2 + \mathbf{2 \times x \times \dfrac{5}{2}} - \dfrac{7}{3} \right)$

$H(x) = 3\left[ \left( x^2 + 2 \times x \times \dfrac{5}{2} + \left(\dfrac{5}{2}\right)^2 \right) - \left(\dfrac{5}{2}\right)^2 - \dfrac{7}{3} \right]$

$H(x) = 3\left[ \left( x + \dfrac{5}{2} \right)^2 - \dfrac{25}{4} - \dfrac{7}{3} \right]$

$H(x) = 3\left[ \left( x + \dfrac{5}{2} \right)^2 - \dfrac{75}{12} - \dfrac{28}{12} \right]$

$H(x) = 3\left[ \left( x + \dfrac{5}{2} \right)^2 - \dfrac{103}{12} \right]$

$H(x) = 3\left[ \left( x + \dfrac{5}{2} \right)^2 - \left(\sqrt{\dfrac{103}{12}}\right)^2 \right]$

$H(x) = 3\left[ \left( x + \dfrac{5}{2} + \sqrt{\dfrac{103}{12}} \right)\left( x + \dfrac{5}{2} - \sqrt{\dfrac{103}{12}} \right) \right]$