

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 :

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

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

$\begin{aligned} A(x) &= x^2 + 6x + 5 \\ &= x^2 + 2 \times 3 \times x + 5 \\ &= (x^2 + 2 \times 3 \times x + 3^2) - 3^2 + 5 \\ &= (x+3)^2 - 9 + 5 \\ &= (x+3)^2 - 4 \end{aligned}$	$\begin{aligned} B(x) &= x^2 + 8x + 3 \\ B(x) &= x^2 + 2 \times x \times 4 + 3 \\ B(x) &= (x^2 + 2 \times x \times 4 + 4^2) - 4^2 + 3 \\ B(x) &= (x+4)^2 - 9 + 3 \\ B(x) &= (x+4)^2 - 6 \end{aligned}$
$\begin{aligned} C(x) &= x^2 - 10x + 9 \\ C(x) &= x^2 - 2 \times x \times 5 + 9 \\ C(x) &= (x^2 - 2 \times x \times 5 + 5^2) - 5^2 + 9 \\ C(x) &= (x-5)^2 - 25 + 9 \\ C(x) &= (x-5)^2 - 16 \\ C(x) &= (x-5)^2 - 4^2 \\ C(x) &= (x-1)(x-9) \end{aligned}$	$\begin{aligned} D(x) &= x^2 + 2x + 7 \\ D(x) &= x^2 + 2 \times x \times 1 + 7 \\ D(x) &= (x^2 + 2 \times x \times 1 + 1^2) - 1^2 + 7 \\ D(x) &= (x+1)^2 - 1 + 7 \\ D(x) &= (x+1)^2 + 6 \end{aligned}$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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