

NOTRE DAME DE LA MERCI – MONTPELLIER

CORRIGE

EXERCICE 1 - MARSEILLE 2000.

$$B = (5\sqrt{2} - 7)(5\sqrt{2} + 7)$$

$$B = (5\sqrt{2})^2 - 7^2$$

$$B = 25 \times 2 - 49$$

$$B = 1$$

EXERCICE 2 - BORDEAUX 2000.

$$A = \sqrt{1\ 053} - 3\sqrt{325} + 2\sqrt{52}$$

$$A = \sqrt{81 \times 13} - 3\sqrt{25 \times 13} + 2\sqrt{4 \times 13}$$

$$A = \sqrt{9^2 \times 13} - 3\sqrt{5^2 \times 13} + 2\sqrt{2^2 \times 13}$$

$$A = 9\sqrt{13} - 3 \times 5\sqrt{13} + 2 \times 2\sqrt{13}$$

$$A = (9 - 15 + 4)\sqrt{13}$$

$$A = -2\sqrt{13}$$

EXERCICE 3 - CAEN 2000.

$$C = \sqrt{180} + 3\sqrt{80} - 2\sqrt{125}$$

$$C = \sqrt{36 \times 5} + 3\sqrt{16 \times 5} - 2\sqrt{25 \times 5}$$

$$C = \sqrt{6^2 \times 5} + 3\sqrt{4^2 \times 5} - 2\sqrt{5^2 \times 5}$$

$$C = 6\sqrt{5} + 3 \times 4\sqrt{5} - 2 \times 5\sqrt{5}$$

$$C = (6 + 12 - 10)\sqrt{5}$$

$$C = 8\sqrt{5}$$

EXERCICE 4 - CLERMONT-FERRAND 2000.

1. $D = (3x + 1)(6x - 9) - (2x - 3)^2$

$$D = 18x^2 - 27x + 6x - 9 - (4x^2 - 12x + 9)$$

$$D = 18x^2 - 21x - 9 - 4x^2 + 12x - 9$$

$$D = 14x^2 - 9x - 18$$

2. Pour $x = \frac{3}{2}$: $D = 14 \times \left(\frac{3}{2}\right)^2 - 9 \times \frac{3}{2} - 18$

$$D = 14 \times \frac{9}{4} - \frac{27}{2} - 18$$

$$D = \frac{63}{2} - \frac{27}{2} - \frac{36}{2}$$

$$D = 0$$

Pour $x = \sqrt{2}$: $D = 14 \times (\sqrt{2})^2 - 9 \times \sqrt{2} - 18$

$$D = 14 \times 2 - 9\sqrt{2} - 18$$

$$D = 10 - 9\sqrt{2}$$

EXERCICE 5 - GRENOBLE 2000.

a. $C = \sqrt{27} - 3\sqrt{75}$

$$C = \sqrt{9 \times 3} - 3\sqrt{25 \times 3}$$

$$C = \sqrt{3^2 \times 3} - 3\sqrt{5^2 \times 3}$$

$$C = 3\sqrt{3} - 3 \times 5\sqrt{3}$$

$$C = (3 - 15)\sqrt{3}$$

$$C = -12\sqrt{3}$$

b. $C^2 = (-12\sqrt{3})^2 = 12\sqrt{3} \times 12\sqrt{3} = 144 \times 3 = 432$

EXERCICE 6 - LIMOGES 2000.

$$C = 3\sqrt{2}(\sqrt{3} + 1) + (\sqrt{2} - 1)(\sqrt{2} - 2)$$

$$C = 3\sqrt{2} \times \sqrt{3} + 3\sqrt{2} + (\sqrt{2})^2 - 2\sqrt{2} - \sqrt{2} + 2$$

$$C = 3\sqrt{6} + 3\sqrt{2} + 2 - 3\sqrt{2} + 2$$

$$C = 4 + 3\sqrt{6}$$

EXERCICE 7 - NANTES 2000.

$$A = \sqrt{20} - 12\sqrt{5} + 2\sqrt{125}$$

$$A = \sqrt{4 \times 5} - 12\sqrt{5} + 2\sqrt{25 \times 5}$$

$$A = \sqrt{2^2 \times 5} - 12\sqrt{5} + 2\sqrt{5^2 \times 5}$$

$$A = 2\sqrt{5} - 12\sqrt{5} + 2 \times 5\sqrt{5}$$

$$A = (2 - 12 + 10)\sqrt{5}$$

$$A = 0$$

Exercice 8 - Orléans Tours 2000.

I.

1. $K(x) = (5x - 3)^2 + 6(5x - 3)$

$$K(x) = 25x^2 - 30x + 9 + 30x - 18$$

$$K(x) = 25x^2 - 9$$

2. $K(\sqrt{2}) = 25 \times (\sqrt{2})^2 - 9 = 25 \times 2 - 9 = 41$

II.

$$N = \sqrt{20} - \sqrt{45} - 7\sqrt{5}$$

$$N = \sqrt{4 \times 5} - \sqrt{9 \times 5} - 7\sqrt{5}$$

$$N = \sqrt{2^2 \times 5} - \sqrt{3^2 \times 5} - 7\sqrt{5}$$

$$N = 2\sqrt{5} - 3\sqrt{5} - 7\sqrt{5}$$

$$N = (2 - 3 - 7)\sqrt{5}$$

$$N = -8\sqrt{5}$$

EXERCICE 9 - PARIS 2000.

$$1. \quad D = \sqrt{3} - 1 \quad \text{et} \quad E = \sqrt{3} + 1$$

$$a. \quad D^2 = (\sqrt{3} - 1)^2 = (\sqrt{3})^2 - 2\sqrt{3} + 1^2 \\ = 3 - 2\sqrt{3} + 1 = 4 - 2\sqrt{3}$$

$$E^2 = (\sqrt{3} + 1)^2 = (\sqrt{3})^2 + 2\sqrt{3} + 1^2 \\ = 3 + 2\sqrt{3} + 1 = 4 + 2\sqrt{3}$$

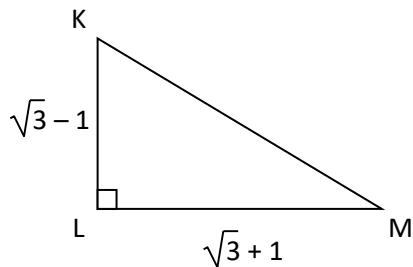
$$b. \quad D \times E = (4 - 2\sqrt{3})(4 + 2\sqrt{3})$$

$$D \times E = 4^2 - (2\sqrt{3})^2$$

$$D \times E = 16 - 4 \times 3$$

$$D \times E = 4$$

2. KLM est un triangle rectangle en L.



a. Le triangle KLM est rectangle en L.

D'après le **théorème de Pythagore** :

$$KM^2 = KL^2 + LM^2$$

$$KM^2 = (\sqrt{3} - 1)^2 + (\sqrt{3} + 1)^2$$

$$KM^2 = 4 - 2\sqrt{3} + 4 + 2\sqrt{3}$$

$$KM^2 = 8$$

$$KM = \sqrt{8} = \sqrt{4 \times 2} = \sqrt{2^2 \times 2} = 2\sqrt{2}$$

b. Aire du triangle KLM :

$$\frac{KL \times LM}{2} = \frac{(4 - 2\sqrt{3})(4 + 2\sqrt{3})}{2} = \frac{4}{2} = 2 \text{ cm}^2$$

EXERCICE 10 - AFRIQUE 2000.

$$A = \sqrt{45} - 2\sqrt{5} + \sqrt{500}$$

$$A = \sqrt{9 \times 5} - 2\sqrt{5} + \sqrt{100 \times 5}$$

$$A = \sqrt{3^2 \times 5} - 2\sqrt{5} + \sqrt{10^2 \times 5}$$

$$A = 3\sqrt{5} - 2\sqrt{5} + 10\sqrt{5}$$

$$A = (3 - 2 + 10)\sqrt{5}$$

$$A = 11\sqrt{5}$$

EXERCICE 11 - AFRIQUE 2000.

$$B = \sqrt{12} + 2\sqrt{48} - \sqrt{75}$$

$$B = \sqrt{4 \times 3} + 2\sqrt{16 \times 3} - \sqrt{25 \times 3}$$

$$B = \sqrt{2^2 \times 3} + 2\sqrt{4^2 \times 3} - \sqrt{5^2 \times 3}$$

$$B = 2\sqrt{3} + 2 \times 4\sqrt{3} - 5\sqrt{3}$$

$$B = (2 + 8 - 5)\sqrt{3}$$

$$B = 5\sqrt{3}$$

EXERCICE 12 - ANTILLES 2000.

$$B = 5\sqrt{27} - 3\sqrt{3} + \sqrt{12}$$

$$B = 5\sqrt{9 \times 3} - 3\sqrt{3} + \sqrt{4 \times 3}$$

$$B = 5\sqrt{3^2 \times 3} - 3\sqrt{3} + \sqrt{2^2 \times 3}$$

$$B = 5 \times 3\sqrt{3} - 3\sqrt{3} + 2\sqrt{3}$$

$$B = (15 - 3 + 2)\sqrt{3}$$

$$B = 14\sqrt{3}$$

EXERCICE 13 - PONDICHERY 2000.

$$1. \quad B = (5 - \sqrt{3})(5 + \sqrt{3})$$

$$B = 5^2 - (\sqrt{3})^2$$

$$B = 25 - 3$$

$$B = 22$$

$$2. \quad C = 4\sqrt{5} - 3\sqrt{45} + \sqrt{500}$$

$$C = 4\sqrt{5} - 3\sqrt{9 \times 5} + \sqrt{100 \times 5}$$

$$C = 4\sqrt{5} - 3\sqrt{3^2 \times 5} + \sqrt{10^2 \times 5}$$

$$C = 4\sqrt{5} - 3 \times 3\sqrt{5} + 10\sqrt{5}$$

$$C = (4 - 9 + 10)\sqrt{5}$$

$$C = 5\sqrt{5}$$