

**EXERCICE 1 :**

Retrouver toutes les solutions de ces équations :

a. $x^2 = 5$ donc $x = \sqrt{5}$ ou $x = -\sqrt{5}$	b. $x^2 = 3$
c. $x^2 = 16$	d. $x^2 = 0$
e. $x^2 = 1$	f. $x^2 = -2$

**EXERCICE 2 :** Résoudre les équations suivantes :

a. $x^2 - 2 = 3$ $x^2 = 3 + 2$ $x^2 = 5$ donc $x = \sqrt{5}$ ou $x = -\sqrt{5}$	b. $x^2 + 6 = 8$
c. $5 - x^2 = -2$	d. $-13 - x^2 = 11$
e. $5x^2 = 15$	f. $3x^2 = 12$
g. $17 - 7x^2 = 3$	h. $6 + 2x^2 = 5$
i. $5x^2 + 7 = 2x^2 - 16$	j. $x^2 - 14 = 5x^2 - 50$

**EXERCICE 3 :** Calculer sans la machine :

a. $\sqrt{2} \times \sqrt{50} =$
b. $\sqrt{12} \times \sqrt{3} =$
c. $\sqrt{2} \times \sqrt{10} \times \sqrt{500} =$
d. $\sqrt{2} \times \sqrt{3} \times \sqrt{4} \times \sqrt{6} =$

**EXERCICE 4 :** Calculer sans la machine :

a. $\frac{\sqrt{18}}{\sqrt{2}} =$
b. $\frac{\sqrt{12}}{\sqrt{27}} =$
c. $\frac{\sqrt{6} \times \sqrt{7}}{\sqrt{14} \times \sqrt{3}} =$
d. $\frac{\sqrt{18} \times \sqrt{6}}{\sqrt{15} \times \sqrt{5}} =$

**EXERCICE 5 :**Écrire sous la forme  $a + b\sqrt{c}$  avec a, b, c entiers :

$A = \sqrt{2}(\sqrt{2} + \sqrt{5})$	$B = 5\sqrt{3}(2\sqrt{3} - 4\sqrt{5})$
$C = (\sqrt{5} + 3\sqrt{2})(\sqrt{2} + \sqrt{5})$	$D = (3\sqrt{7} - 7\sqrt{3})(\sqrt{3} + 2\sqrt{7})$

**EXERCICE 6 :**Écrire sous la forme  $a + b\sqrt{c}$  avec a, b, c entiers :

$A = (\sqrt{2} + \sqrt{5})^2$	$B = (\sqrt{3} - \sqrt{5})^2$
$C = (2\sqrt{3} + 3\sqrt{5})^2$	$D = (5\sqrt{7} - 3\sqrt{2})^2$

## Notre Dame de La Merci – CORRIGE

## EXERCICE 1 :

a. $x^2 = 5$ donc $x = \sqrt{5}$ ou $x = -\sqrt{5}$	b. $x^2 = 3$ donc $x = \sqrt{3}$ ou $x = -\sqrt{3}$
c. $x^2 = 16$ donc $x = 4$ ou $x = -4$	d. $x^2 = 0$ donc $x = 0$
e. $x^2 = 1$ donc $x = 1$ ou $x = -1$	f. $x^2 = -2$ pas de solution

## EXERCICE 2 : Résoudre les équations suivantes :

a. $x^2 - 2 = 3$ $x^2 = 3 + 2$ $x^2 = 5$ donc $x = \sqrt{5}$ ou $x = -\sqrt{5}$	b. $x^2 + 6 = 8$ $x^2 = 8 - 6$ $x^2 = 2$ donc $x = \sqrt{2}$ ou $x = -\sqrt{2}$
c. $5 - x^2 = -2$ $-x^2 = -2 - 5$ $-x^2 = -7$ $x^2 = 7$ donc $x = \sqrt{7}$ ou $x = -\sqrt{7}$	d. $-13 - x^2 = 11$ $-x^2 = 11 + 13$ $-x^2 = 24$ $x^2 = -24$ pas de solution
e. $5x^2 = 15$ $x^2 = \frac{15}{5} = 3$ donc $x = \sqrt{3}$ ou $x = -\sqrt{3}$	f. $3x^2 = 12$ $x^2 = \frac{12}{3} = 4$ donc $x = \sqrt{4} = 2$ ou $x = -\sqrt{4} = -2$
g. $17 - 7x^2 = 3$ $-7x^2 = 3 - 17$ $-7x^2 = -14$ $x^2 = \frac{-14}{-7} = 2$ $x = \sqrt{2}$ ou $x = -\sqrt{2}$	h. $6 + 2x^2 = 5$ $2x^2 = 5 - 6$ $2x^2 = -1$ $x^2 = -\frac{1}{2}$ pas de solution
i. $5x^2 + 7 = 2x^2 - 16$ $5x^2 + 7 - 2x^2 = -16$ $3x^2 = -16 - 7$ $3x^2 = -23$ $x^2 = \frac{-23}{3}$ pas de solution	j. $x^2 - 14 = 5x^2 - 50$ $x^2 - 14 - 5x^2 = -50$ $-4x^2 = -50 + 14$ $-4x^2 = -36$ $x^2 = \frac{-36}{-4} = 9$ donc $x = \sqrt{9} = 3$ ou $x = -\sqrt{9} = -3$

## EXERCICE 3 : Calculer sans la machine :

a. $\sqrt{2} \times \sqrt{50} = \sqrt{2} \times \sqrt{2} \times \sqrt{25} = 2 \times 5 = 10$ $\sqrt{2} \times \sqrt{50} = \sqrt{2 \times 50} = \sqrt{100} = 10$
b. $\sqrt{12} \times \sqrt{3} = \sqrt{4} \times \sqrt{3} \times \sqrt{3} = 2 \times 3 = 6$ $\sqrt{12} \times \sqrt{3} = \sqrt{12 \times 3} = \sqrt{36} = 6$
c. $\sqrt{2} \times \sqrt{10} \times \sqrt{500} = \sqrt{2} \times \sqrt{10} \times \sqrt{10} \times \sqrt{50}$ $= \sqrt{2} \times 10 \times \sqrt{25} \times \sqrt{2}$ $= 2 \times 10 \times 5 = 100$
d. $\sqrt{2} \times \sqrt{3} \times \sqrt{4} \times \sqrt{6} = \sqrt{2} \times \sqrt{3} \times 2 \times \sqrt{2} \times \sqrt{3}$ $= 2 \times 2 \times 3 = 12$

## EXERCICE 4 : Calculer sans la machine :

a. $\frac{\sqrt{18}}{\sqrt{2}} = \sqrt{\frac{18}{2}} = \sqrt{9} = 3$ $\frac{\sqrt{18}}{\sqrt{2}} = \frac{\sqrt{18}}{\sqrt{2}} = \frac{\sqrt{9 \times 2}}{\sqrt{2}} = \frac{\sqrt{9} \times \sqrt{2}}{\sqrt{2}} = 3$
b. $\frac{\sqrt{12}}{\sqrt{27}} = \sqrt{\frac{12}{27}} = \sqrt{\frac{4 \times 3}{9 \times 3}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$
c. $\frac{\sqrt{6} \times \sqrt{7}}{\sqrt{14} \times \sqrt{3}} = \frac{\sqrt{6 \times 7}}{\sqrt{14 \times 3}} = \sqrt{\frac{3 \times 2 \times 7}{7 \times 2 \times 3}} = \sqrt{1} = 1$
d. $\frac{\sqrt{18} \times \sqrt{6}}{\sqrt{15} \times \sqrt{5}} = \frac{\sqrt{18 \times 6}}{\sqrt{15 \times 5}} = \sqrt{\frac{3 \times 6 \times 6}{3 \times 5 \times 5}} = \sqrt{\frac{36}{25}} = \frac{6}{5}$

## EXERCICE 5 :

$A = \sqrt{2}(\sqrt{2} + \sqrt{5})$	$B = 5\sqrt{3}(2\sqrt{3} - 4\sqrt{5})$
$A = \sqrt{2} \times \sqrt{2} + \sqrt{2} \times \sqrt{5}$	$B = 5\sqrt{3} \times 2\sqrt{3} - 5\sqrt{3} \times 4\sqrt{5}$
$A = 2 + \sqrt{10}$	$B = 10 \times \sqrt{3} \times \sqrt{3} - 20\sqrt{3} \times \sqrt{5}$
	$B = 10 \times 3 - 20\sqrt{15}$
	$B = 30 - 20\sqrt{15}$

$$C = (\sqrt{5} + 3\sqrt{2})(\sqrt{2} + \sqrt{5})$$

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

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

$$C = 4\sqrt{10} + 11$$

$$D = (3\sqrt{7} - 7\sqrt{3})(\sqrt{3} + 2\sqrt{7})$$

$$D = 3\sqrt{7} \times \sqrt{3} + 3\sqrt{7} \times 2\sqrt{7} - 7\sqrt{3} \times \sqrt{3} - 7\sqrt{3} \times 2\sqrt{7}$$

$$D = 3\sqrt{21} + 6 \times 7 - 7 \times 3 - 14\sqrt{21}$$

$$D = 42 - 21 - 11\sqrt{21}$$

$$D = 21 - 11\sqrt{21}$$

**EXERCICE 6 :**

$$A = (\sqrt{2} + \sqrt{5})^2$$

$$A = (\sqrt{2})^2 + 2 \times \sqrt{2} \times \sqrt{5} + (\sqrt{5})^2$$

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

$$A = 7 + 2\sqrt{10}$$

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

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

$$B = 3 - 2\sqrt{15} + 5$$

$$B = 8 - 2\sqrt{15}$$

$$C = (2\sqrt{3} + 3\sqrt{5})^2$$

$$C = (2\sqrt{3})^2 + 2 \times 2\sqrt{3} \times 3\sqrt{5} + (3\sqrt{5})^2$$

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

$$C = 4 \times 3 + 12 \times \sqrt{15} + 9 \times 5$$

$$C = 12 + 12\sqrt{15} + 45$$

$$C = 57 + 12\sqrt{15}$$

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

$$D = (5\sqrt{7})^2 - 2 \times 5\sqrt{7} \times 3\sqrt{2} + (3\sqrt{2})^2$$

$$D = 5\sqrt{7} \times 5\sqrt{7} - 2 \times 5 \times 3 \times \sqrt{7} \times \sqrt{2} + 3\sqrt{2} \times 3\sqrt{2}$$

$$D = 25 \times 7 - 30 \times \sqrt{14} + 9 \times 2$$

$$D = 175 - 30\sqrt{14} + 18$$

$$D = 193 - 30\sqrt{14}$$