

Qu'est-ce qu'une équation produit nul?

1/6

Ex équations produits (page 3)

a) $(x+2)(10-x)=0$

$x+2=0$ ou $10-x=0$
 -2 \hookrightarrow $x=-2$ $\downarrow -2$ ou -10 \hookrightarrow $-x=-10$ $\downarrow -10$
 $x-10$ \hookrightarrow $x=10$ $\downarrow x-1$

Donc $S = \{-2; 10\}$

b) $5x(3x+5)=0$

$5x=0$ ou $3x+5=0$
 $\div 5$ \hookrightarrow $x=0$ $\downarrow \div 5$ ou -5 \hookrightarrow $3x=-5$ $\downarrow -5$
 $\div 3$ \hookrightarrow $x=-\frac{5}{3}$ $\downarrow \div 3$

Donc $S = \{0; -\frac{5}{3}\}$

c) $(2x-1)^2=0$

$2x-1=0$ ou $2x-1=0$
 $+1$ \hookrightarrow $2x=1$ $\downarrow +1$
 $\div 2$ \hookrightarrow $x=\frac{1}{2}$ $\downarrow \div 2$

$S = \left\{ \frac{1}{2} \right\}$
1
0,5

$$d) (3x-5)(3x+5)=0.$$

$$\begin{array}{l} +5 \downarrow \\ \div 3 \downarrow \\ 3x-5=0 \\ \downarrow +5 \\ 3x = 5 \\ \downarrow \div 3 \\ x = \frac{5}{3} \end{array} \quad \text{ou} \quad \begin{array}{l} -5 \downarrow \\ \div 3 \downarrow \\ 3x+5=0 \\ \downarrow -5 \\ 3x = -5 \\ \downarrow \div 3 \\ x = -\frac{5}{3} \end{array}$$

$$S = \left\{ -\frac{5}{3}; \frac{5}{3} \right\}$$

À quoi servent les Id remarquables?

ex 1

Identités Remarquables

$$\begin{aligned} A(x) &= (x-6)(x+6) \\ &= x^2 - 36 \end{aligned}$$

$$\begin{aligned} a &= x \\ b &= 6 \end{aligned}$$

$$\begin{aligned} B(x) &= (2x+5)(2x-5) \\ &= 4x^2 - 25 \end{aligned}$$

$$\begin{aligned} a &= 2x \\ b &= 5 \end{aligned}$$

$$\begin{aligned} C(x) &= (x-\sqrt{2})(x+\sqrt{2}) \\ &= x^2 - 2 \end{aligned}$$

$$\begin{aligned} a &= x \\ b &= \sqrt{2} \end{aligned}$$

ex 2

$$\begin{aligned} G(x) &= x^2 - 4 \\ &= (x-2)(x+2) \end{aligned}$$

$$\begin{aligned} a &= x \\ b &= 2 \end{aligned}$$

$$\begin{aligned} D(x) &= 16 - 9x^2 \\ &= (4-3x)(4+3x) \end{aligned}$$

$$\begin{aligned} a &= 4 \\ b &= 3x \end{aligned}$$

$$\begin{aligned} E(x) &= 16x^2 - 144 \\ &= (4x-12)(4x+12) \end{aligned}$$

$$\begin{aligned} a &= 4x \\ b &= 12 \end{aligned}$$

$$\begin{aligned} F(x) &= 13 - 81x^2 \\ &= (\sqrt{13}-9x)(\sqrt{13}+9x) \end{aligned}$$

$$\begin{aligned} a &= \sqrt{13} \\ b &= 9x \end{aligned}$$

ex 3 $x^2 - 64 = 0$ $\Rightarrow (x - 8)(x + 8) = 0$ \downarrow je factorise avec la 3^e IR

\Rightarrow $x - 8 = 0$ ou $x + 8 = 0$
 $+8 \left\{ \begin{array}{l} x = 8 \\ x = -8 \end{array} \right. \downarrow +8 \quad \text{ou} \quad -8 \left\{ \begin{array}{l} x = -8 \\ x = 8 \end{array} \right. \downarrow -8$

$$S = \{-8; 8\}$$

$\Rightarrow x^2 = 9$
 $\Rightarrow x^2 - 9 = 0$

$\Rightarrow (x - 3)(x + 3) = 0$

$+3 \left\{ \begin{array}{l} x - 3 = 0 \\ x = 3 \end{array} \right. \downarrow +3 \quad \text{ou} \quad -3 \left\{ \begin{array}{l} x + 3 = 0 \\ x = -3 \end{array} \right. \downarrow -3$

$$S = \{-3; 3\}$$

$\Rightarrow x^2 = 0$
 $\Rightarrow x = 0$

$$S = \{0\}$$

$\Rightarrow x^2 - 49 = 0$
 $\Rightarrow (x - 7)(x + 7) = 0$

$+7 \left\{ \begin{array}{l} x - 7 = 0 \\ x = 7 \end{array} \right. \downarrow +7 \quad \text{ou} \quad -7 \left\{ \begin{array}{l} x + 7 = 0 \\ x = -7 \end{array} \right. \downarrow -7$

$$S = \{-7; 7\}$$

$$16x^2 - 25 = 0.$$

$$\Leftrightarrow (4x - 5)(4x + 5) = 0.$$

$$\Leftrightarrow \begin{array}{l} 4x - 5 = 0 \quad \text{ou} \quad 4x + 5 = 0 \\ +5 \downarrow \quad 4x = 5 \quad \downarrow +5 \quad \text{ou} \quad -5 \downarrow \quad 4x = -5 \quad \downarrow -5 \\ \div 4 \downarrow \quad x = \frac{5}{4} \quad \downarrow \div 4 \quad \text{ou} \quad \div 4 \downarrow \quad x = -\frac{5}{4} \quad \downarrow \div 4 \end{array}$$

$$S = \left\{ -\frac{5}{4}, \frac{5}{4} \right\}$$

$$x^2 = 20.$$

$$\Leftrightarrow x^2 - 20 = 0.$$

$$\Leftrightarrow (x - \sqrt{20})(x + \sqrt{20}) = 0.$$

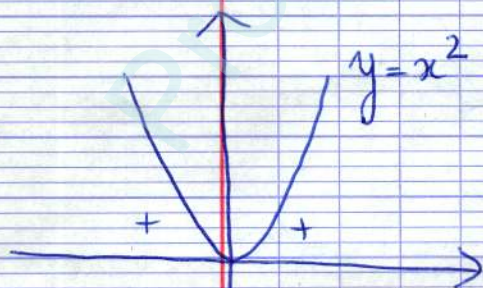
$$\Leftrightarrow (x - 2\sqrt{5})(x + 2\sqrt{5}) = 0.$$

$$\Leftrightarrow \begin{array}{l} (x - 2\sqrt{5}) = 0 \quad \text{ou} \quad x + 2\sqrt{5} = 0 \\ x = 2\sqrt{5} \quad \text{ou} \quad x = -2\sqrt{5} \end{array}$$

$$S = \{ -2\sqrt{5}, 2\sqrt{5} \}$$

$$x^2 = -9$$

Pas de solution. Un carré ne peut pas être négatif.



← la courbe n'est pas dans cette zone

$$4x^2 - 49 = 0.$$

$$\Leftrightarrow (2x - 7)(2x + 7) = 0.$$

$$\Leftrightarrow 2x - 7 = 0 \quad \text{ou} \quad 2x + 7 = 0.$$

$$\begin{array}{l} +7 \quad 2x = 7 \quad | +7 \\ \div 2 \quad x = \frac{7}{2} \quad | :2 \end{array} \quad \text{ou} \quad \begin{array}{l} -7 \quad 2x = -7 \quad | -7 \\ \div 2 \quad x = -\frac{7}{2} \quad | :2 \end{array}$$

$$S = \left\{ -\frac{7}{2}, \frac{7}{2} \right\}$$

$$x^2 = 11.$$

$$\Leftrightarrow x^2 - 11 = 0.$$

$$\Leftrightarrow (x - \sqrt{11})(x + \sqrt{11}) = 0.$$

$$\Leftrightarrow x - \sqrt{11} = 0 \quad \text{ou} \quad x + \sqrt{11} = 0.$$

$$\Leftrightarrow x = \sqrt{11} \quad \text{ou} \quad x = -\sqrt{11}.$$

$$S = \left\{ -\sqrt{11}; \sqrt{11} \right\}.$$

$$(x+2)^2 - 9 = 0.$$

$$\Leftrightarrow (x+2-3)(x+2+3) = 0.$$

$$\Leftrightarrow (x-1)(x+5) = 0.$$

$$\Leftrightarrow x - 1 = 0 \quad \text{ou} \quad x + 5 = 0.$$

$$\Leftrightarrow x = 1 \quad \text{ou} \quad x = -5.$$

$$S = \{ 1, -5 \}$$