$$\begin{cases} 3^x - 3^y = 3 \\ 3^{(x+y)} = 3 \end{cases}$$

$x = ?$ et $y = ?$

---------- Q U E S T I O N ----------

| 3^x - 3^y = 3
|
| 3^(x + y) = 3

x = ? et y = ?

---------- R É P O N S E ----------

| 3^x - 3^y = 3
|
| 3^(x + y) = 3

| 3^x - 3^y = 3
|
| 3^x·3^y = 3

soit:

• 3^x = a

• -(3^y) = b

| a + b = 3
|
| ab = -3

rappel (système "somme et produit"):

• si S est la somme de a avec b

• si P est le produit de a avec b

• alors les racines  de $z^2 - Sz + P = 0$ sont a et b

| a + b = 3 = S
|
| ab = -3 = P

$z^2 - 3z - 3 = 0$

$\Delta = (-3)^2 - 4 \cdot 1 \cdot (-3) = 9 + 12 = 21$

$\sqrt{\Delta} = +/- \sqrt{21}$

• cas $\sqrt{\Delta} = +\sqrt{21}$: a = (-(-3) + √21)/2·1 = = 3/2 + √21/2

• cas $\sqrt{\Delta} = -\sqrt{21}$: b = (-(-3) - √21)/2·1 = = 3/2 - √21/2

(voir page suivante)

----- 3^x = a -----

3^x = a = 3/2 + √21/2

3^x = 3/2 + √21/2

x = log(3/2 + √21/2)/log(3)

```
 ------------------
|   x ≈ 1,213081   |
 ------------------
```

----- -3^y = b -----

-3^y = b = 3/2 - √21/2

-3^y = 3/2 - √21/2

3^y = √21/2 - 3/2

y = log(√21/2 - 3/2)/log(3)

```
 --------------------
|   y ≈ -0,213081   |
 --------------------
```

----- Vérification -----

3^x - 3^y = 3

3^1,213081 - 3^-0,213081 = 2,999999 <--- ok

-----

3^(x + y) = 3

3^(1,213081 + -0,213081) = 3^1

3^1 = 3 <--- ok

(fin)