

**Exercice 1 :**

$$A = \frac{2 \times (10^{-15})^2 \times 7 \times 10^{-18}}{5 \times 10^{50} \times 14 \times 10^{-40}} = \frac{2 \times 7 \times 10^{-30} \times 10^{-18}}{5 \times 2 \times 10^{50} \times 10^{-40}} = \frac{10^{-48}}{5 \times 10^{10}} = \frac{1}{5} \times \frac{1}{10^{58}} = \frac{2}{10} \times \frac{1}{10^{58}} = \frac{2}{10^{59}} \in \mathbb{D}$$

$$B = \frac{1}{2} - \frac{5}{2} \times \left(2 - \frac{1}{5}\right) = \frac{1}{2} - \frac{5}{2} \times \left(\frac{10}{5} - \frac{1}{5}\right) = \frac{1}{2} - \frac{5}{2} \times \frac{9}{5} = \frac{1}{2} - \frac{9}{2} = -\frac{8}{2} = -4 \in \mathbb{Z}$$

$$C = 1 + 2,0252525$$

On pose  $x = 2,0252525$  alors  $100x = 202,5252525$  donc  $100x - x = 202,52525 - 2,02525$

$$\text{donc } 99x = 200,5 \text{ donc } x = \frac{200,5}{99} = \frac{2005}{990} = \frac{401}{198}$$

$$\text{Donc } C = 1 + \frac{401}{198} = \frac{198}{198} + \frac{401}{198} = \frac{599}{198} \in \mathbb{Q}$$

**Exercice 2 :**

$$D = \frac{\sqrt{3}+2}{2-\sqrt{3}} - 4\sqrt{3} = \frac{(\sqrt{3}+2)(2+\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})} - 4\sqrt{3} = \frac{3+4\sqrt{3}+4}{4-3} - 4\sqrt{3} = \frac{7+4\sqrt{3}}{1} - 4\sqrt{3} = 7+4\sqrt{3}-4\sqrt{3} = 7 \in \mathbb{N}$$

$$E = 2 \left( \frac{1+\sqrt{5}}{2} \right)^2 - \sqrt{5} = 2 \times \frac{1+2\sqrt{5}+5}{4} - \sqrt{5} = \frac{2(6+2\sqrt{5})}{4} - \sqrt{5} = \frac{4(3+\sqrt{5})}{4} - \sqrt{5} = 3+\sqrt{5}-\sqrt{5} = 3 \in \mathbb{N}$$

$$F = \frac{3}{\sqrt{5}} \times \sqrt{1+\frac{2}{3}} \times \sqrt{1-\frac{2}{3}} = \frac{3}{\sqrt{5}} \times \sqrt{\left(1+\frac{2}{3}\right) \times \left(1-\frac{2}{3}\right)} = \frac{3}{\sqrt{5}} \times \sqrt{1^2 - \left(\frac{2}{3}\right)^2}$$

$$= \frac{3}{\sqrt{5}} \times \sqrt{1-\frac{4}{9}} = \frac{3}{\sqrt{5}} \times \sqrt{\frac{9}{9}-\frac{4}{9}} = \frac{3}{\sqrt{5}} \times \sqrt{\frac{5}{9}} = \frac{3}{\sqrt{5}} \times \frac{\sqrt{5}}{3} = 1 \in \mathbb{N}$$

**Exercice 3 :**

1. Faire un croquis.
2. Diviseurs de 385 : 1; 5; 7; 11; 35; 55; 77; 385  
Diviseurs de 231 : 1; 3; 7; 11; 21; 33; 77; 231  
Diviseurs communs aux deux nombres : 1; 7; 11; 77
3. ▷ Si la distance entre les arbustes est de 1 m :  
Il y a  $(385 + 231) \times 2 = 1232$  arbustes.  
▷ Si la distance entre les arbustes est de 7 m :  
Il y a  $(55 + 33) \times 2 = 176$  arbustes.  
▷ Si la distance entre les arbustes est de 11 m :  
Il y a  $(33 + 21) \times 2 = 108$  arbustes.  
▷ Si la distance entre les arbustes est de 77 m :  
Il y a  $(3 + 5) \times 2 = 16$  arbustes.

**Exercice 4 :**

$$G = 24378527889 \times 24378527891 - 24378527890^2$$

$$\text{On pose } x = 24371527890 \text{ alors } G = (x-1)(x+1) - x^2 = x^2 - 1 - x^2 = -1$$

$$H = 4781519^2 - 4781521^2$$

On pose  $y = 4781520$  alors

$$H = (y-1)^2 - (y+1)^2 = (y^2 - 2y + 1) - (y^2 + 2y + 1) = y^2 - 2y + 1 - y^2 - 2y - 1 = -4y$$

$$\text{donc } H = -19126080$$