

Exercice 1

Donner la forme canonique des polynômes P , Q , R et S .

$$P(x) = 81x^2 - 72x + 16 \quad Q(x) = 3x^2 - 7x + 3 \quad R(x) = x^2 - 2x + 1 \quad S(x) = x^2 - 3x - 6$$

Exercice 2

Donner la forme canonique des polynômes P , Q , R et S .

$$P(x) = 81x^2 + 18x + 1 \quad Q(x) = x^2 - 7x - 9 \quad R(x) = x^2 + 8x + 6 \quad S(x) = 4x^2 + 4x - 1$$

Exercice 3

Donner la forme canonique des polynômes P , Q , R et S .

$$P(x) = 2x^2 - 4x + 6 \quad Q(x) = 9x^2 - 48x + 64 \quad R(x) = x^2 + 18x + 2 \quad S(x) = x^2 + 7x + 6$$

Corrigé de l'exercice 1Donner la forme canonique des polynômes P , Q , R et S .

$$\begin{aligned} P(x) &= 81x^2 - 72x + 16 \\ &= (9x - 4)^2 \\ &= \left(9 \times \left(x - \frac{4}{9}\right)\right)^2 \end{aligned}$$

$$P(x) = 81 \times \left(x - \frac{4}{9}\right)^2$$

$$\begin{aligned} Q(x) &= 3x^2 - 7x + 3 \\ &= 3 \times \left(x^2 - \frac{7}{3}x + 1\right) \\ &= 3 \times \left(\left(x - \frac{7}{6}\right)^2 - \left(\frac{7}{6}\right)^2 + 1\right) \\ &= 3 \times \left(\left(x - \frac{7}{6}\right)^2 + \frac{-49}{36} + \frac{1 \times 36}{1 \times 36}\right) \end{aligned}$$

$$\begin{aligned} &= 3 \times \left(\left(x - \frac{7}{6}\right)^2 + \frac{-49}{36} + \frac{36}{36}\right) \\ &= 3 \times \left(\left(x - \frac{7}{6}\right)^2 + \frac{-13}{36}\right) \\ &= 3 \times \left(x - \frac{7}{6}\right)^2 + \frac{-13 \times 3}{3 \times 12} \end{aligned}$$

$$Q(x) = 3 \times \left(x - \frac{7}{6}\right)^2 + \frac{-13}{12}$$

$$\begin{aligned} S(x) &= x^2 - 3x - 6 \\ &= \left(x - \frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)^2 - 6 \\ &= \left(x - \frac{3}{2}\right)^2 + \frac{-9}{4} - \frac{6 \times 4}{1 \times 4} \\ &= \left(x - \frac{3}{2}\right)^2 + \frac{-9}{4} - \frac{24}{4} \end{aligned}$$

$$S(x) = \left(x - \frac{3}{2}\right)^2 + \frac{-33}{4}$$

$$\begin{aligned} R(x) &= x^2 - 2x + 1 \\ &= (x - 1)^2 - 1^2 + 1 \\ &= (x - 1)^2 + 1 + 1 \end{aligned}$$

$$R(x) = (x - 1)^2 + 2$$

Corrigé de l'exercice 2Donner la forme canonique des polynômes P , Q , R et S .

$$\begin{aligned} P(x) &= 81x^2 + 18x + 1 \\ &= (9x + 1)^2 \\ &= \left(9 \times \left(x + \frac{1}{9}\right)\right)^2 \end{aligned}$$

$$P(x) = 81 \times \left(x + \frac{1}{9}\right)^2$$

$$\begin{aligned} Q(x) &= x^2 - 7x - 9 \\ &= \left(x - \frac{7}{2}\right)^2 - \left(\frac{7}{2}\right)^2 - 9 \\ &= \left(x - \frac{7}{2}\right)^2 + \frac{-49}{4} - \frac{9 \times 4}{1 \times 4} \\ &= \left(x - \frac{7}{2}\right)^2 + \frac{-49}{4} - \frac{36}{4} \end{aligned}$$

$$Q(x) = \left(x - \frac{7}{2}\right)^2 + \frac{-85}{4}$$

$$\begin{aligned} S(x) &= 4x^2 + 4x - 1 \\ &= 4 \times \left(x^2 + x - \frac{1}{4}\right) \\ &= 4 \times \left(\left(x + \frac{1}{2}\right)^2 - \left(\frac{1}{2}\right)^2 + \frac{-1}{4}\right) \end{aligned}$$

$$= 4 \times \left(\left(x + \frac{1}{2}\right)^2 + \frac{-2}{4}\right)$$

$$= 4 \times \left(\left(x + \frac{1}{2}\right)^2 + \frac{-1 \times 2}{2 \times 2}\right)$$

$$= 4 \times \left(\left(x + \frac{1}{2}\right)^2 + \frac{-1}{2}\right)$$

$$= 4 \times \left(x + \frac{1}{2}\right)^2 + \frac{-1 \times 2 \times 2}{2 \times 1}$$

$$S(x) = 4 \times \left(x + \frac{1}{2}\right)^2 - 2$$

$$\begin{aligned} R(x) &= x^2 + 8x + 6 \\ &= (x + 4)^2 - 4^2 + 6 \\ &= (x + 4)^2 + 16 + 6 \end{aligned}$$

$$R(x) = (x + 4)^2 + 22$$

Corrigé de l'exercice 3

Donner la forme canonique des polynômes P , Q , R et S .

$$P(x) = 2x^2 - 4x + 6$$

$$= 2 \times (x^2 - 2x + 3)$$

$$= 2 \times ((x-1)^2 - 1^2 + 3)$$

$$= 2 \times ((x-1)^2 + 1 + 3)$$

$$= 2 \times ((x-1)^2 + 4)$$

$$P(x) = 2 \times (x-1)^2 + 8$$

$$Q(x) = 9x^2 - 48x + 64$$

$$= (3x - 8)^2$$

$$= \left(3 \times \left(x - \frac{8}{3}\right)\right)^2$$

$$Q(x) = 9 \times \left(x - \frac{8}{3}\right)^2$$

$$R(x) = x^2 + 18x + 2$$

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

$$= (x+9)^2 + 81 + 2$$

$$R(x) = (x+9)^2 + 83$$

$$S(x) = x^2 + 7x + 6$$

$$= \left(x + \frac{7}{2}\right)^2 - \left(\frac{7}{2}\right)^2 + 6$$

$$= \left(x + \frac{7}{2}\right)^2 + \frac{-49}{4} + \frac{6 \times 4}{1 \times 4}$$

$$= \left(x + \frac{7}{2}\right)^2 + \frac{-49}{4} + \frac{24}{4}$$

$$S(x) = \left(x + \frac{7}{2}\right)^2 + \frac{-25}{4}$$