Feuille d'exercice n° 05 : **Calculs sur les complexes – Fiche d'entraînement – Correction**

Exercice 1

1) $\mathscr{C}(1,1) \cap \mathscr{C}\left(-1, \frac{3}{2}\right) = \left\{\frac{5}{16} - i\frac{15}{16}, \frac{5}{16} + i\frac{15}{16}\right\}$

2) $\mathscr{C}(i,2) \cap \mathscr{C}(1,1) = \left\{\frac{5-\sqrt{7}}{4} - i\frac{1+\sqrt{7}}{4}, \frac{5+\sqrt{7}}{4} + i\frac{-1+\sqrt{7}}{4}\right\}$

3) $\mathscr{C}(i,1) \cap \mathscr{C}(1+4i,3) = \{1+i\}$

4) $\mathscr{C}(3i,1) \cap \mathscr{C}(5,2) = \varnothing$

Exercice 2

1) $\pm(1-3i)$

2) $\pm(5+i)$

3) $\pm\left(\sqrt{\frac{\sqrt{58}+3}{2}} - i\sqrt{\frac{\sqrt{58}-3}{2}}\right)$

4) $\pm\left(\sqrt{\frac{\sqrt{29}+5}{2}} + i\sqrt{\frac{\sqrt{29}-5}{2}}\right)$

Exercice 3

1) $\{3-i; -2+2i\}$

2) $\{4; 1-2i\}$

3) $\{i; 7-i\}$

4) $\{5i; 2+i\}$

Exercice 4

1) $(-2)^n \sin^n\left(\frac{x}{2}\right) \sin\left(\frac{nx}{2} + \frac{n\pi}{2}\right)$

2) $\frac{\sin(nx)\sin((n+1)x)}{2\sin(x)}$ si $x \neq 0$ $[\pi]$, 0 sinon.

Exercice 5

1) $\frac{1}{4}\sin(2x) - \frac{1}{8}\sin(4x)$

2) $\frac{19}{16} + \frac{47}{32}\cos(2x) + \frac{5}{16}\cos(4x) + \frac{1}{32}\cos(6x)$

3) $\frac{1}{8} - \frac{1}{8}\cos(4x)$

4) $\frac{3}{4}\sin(x) + \frac{3}{32}\sin(2x) + \frac{3}{4}\sin(3x) - \frac{1}{32}\sin(6x)$

Exercice 6

1) $8\cos^4(x) - 8\cos^2(x) + 1$

2) $63\cos^7(x) - 112\cos^5(x) + 56\cos^3(x) - 7\cos(x)$

3) $8\cos^5(x) - 10\cos^3(x) + 3\cos(x)$

4) $-16\cos^6(x) + 24\cos^4(x) - 8\cos^2(x)$