Exercises [A]

1. Find the remainder when $x^6 - 3x^4 + 8$ is divided by $x - 1$.
2. Find the remainder when $x^5 + 6x^2 + 20$ is divided by $x + 2$.
3. Show that 2 is a root of $x^3 - 8x + 8 = 0$, and find the other two roots.
4. Show that 1 is a root of $x^3 + 3x^2 + x - 5 = 0$, and find the other two roots.
5. Determine whether $x - 2$ is a factor of $x^4 - 5x^2 + x + 4$.
6. Determine whether $x + 1$ is a factor of $2x^3 - 3x + 1$.
7. If $f(x) = 2x^3 - 5x^2 - 4x + 3$, show that $f(-1) = 0$. Factor $f(x)$.
8. If $f(x) = x^3 + x^2 - 5x - 2$, show that $f(2) = 0$. Factor $f(x)$.
9. Solve completely: $x^3 - 2x + 1 = 0$.
10. Solve completely: $x^3 - 2x^2 + 3 = 0$.

1. 6
2. 12
3. $-1 + \sqrt{5}$, $-1 - \sqrt{5}$
4. $-2 + i$, $-2 - i$
5. Not a factor
6. Not a factor
7. $(x + 1)(2x - 1)(x - 3)$
8. $(x - 2)(x^2 + 3x + 1)$
9. $\{1, -\frac{1}{2} + \frac{1}{2}\sqrt{5}, -\frac{1}{2} - \frac{1}{2}\sqrt{5}\}$
10. $\{-1, \frac{3}{2} + \frac{1}{2}i\sqrt{3}, \frac{3}{2} - \frac{1}{2}i\sqrt{3}\}$