1. The only polynomial of any degree such that $p(0) = 0$ and $p(1) = 1$ is the linear polynomial $p(x) = x$.

2. Given $x_0 < x_1 < \ldots < x_n \in \mathbb{R}$ and $y_0, y_1, \ldots, y_n \in \mathbb{R}$, which of the following assertions may be false?

    - there exists a polynomial $p \in \mathcal{P}_{n+1}$ such that $p(x_i) = y_i$ for all $i \in \{0, 1, \ldots, n\}$.
    - there exists a unique polynomial $p \in \mathcal{P}_{n+1}$ such that $p(x_i) = y_i$ for all $i \in \{0, 1, \ldots, n\}$.
    - there exists a polynomial $p \in \mathcal{P}_n$ such that $p(x_i) = y_i$ for all $i \in \{0, 1, \ldots, n\}$.
    - there exists a unique polynomial $p \in \mathcal{P}_n$ such that $p(x_i) = y_i$ for all $i \in \{0, 1, \ldots, n\}$.

3. In interpolation, the choice of interpolating points does not affect the accuracy of the interpolation.

4. In polynomial interpolation, using Chebyshev nodes can help reduce the interpolation error compared to using equidistant nodes.

5. Gregory–Newton interpolation is well-suited for incremental interpolation.

6. Suppose that $f\colon [-1, 1] \to \mathbb{R}$ is a smooth function, and for any $n \in \mathbb{N}$, let $f_n \in \mathcal{P}_n$ denote the polynomial interpolating f at $n + 1$ equidistant points $-1 = x_0 < x_1 < \ldots < x_n = 1$. Then

$$\lim_{n \to \infty} \left(\max_{-1 \leq x \leq 1} \bigl| f(x) - f_n(x) \bigr| \right) = 0.$$

7. Let $(f_0, f_1, f_2, f_3, \ldots) = (1, 1, 2, 3, \ldots)$ denote the Fibonacci sequence. Does there exist a polynomial p such that

$$\forall n \in \mathbb{N}, \qquad f_n = p(n)\,?$$

    Hint: If this is true, then there must be $d \in \mathbb{N}$ such that $(\Delta^d f)_i = 0$ for all i, because application of the difference operator Δ to a polynomial decreases its degree by 1.

8. In Julia, if `A` is a matrix, then `A[:, 1]` gives the first column of `A`.

9. In Julia, if `A` is a matrix, then `A[:, 2:end]` gives the full matrix `A`.

10. What is `p` in the following code?

    - The interpolating polynomial.
    - The Lagrange polynomial associated with $x = 4$.
    - The Lagrange polynomial associated with $x = 8$.
    - None of the above.

```
using Plots
x = [2, 4, 6, 8, 10]
p(z) = prod((z .- x[1:end .!== 4]) ./ (x[4] .- x[1:end .!== 4]))
plot(p, xlims=(0, 12))
scatter!(x, p)
```