MATHEMATICAL WRITING CHEAT SHEET

Logical Progression and Reasoning

- *Therefore, it follows that...*
- *Thus, we conclude that...*
- *Hence, we obtain...*
- *From this, it follows that...*
- *As a result, we deduce that...*
- *Consequently, we see that...*
- *Since C is always true, we must have...*

If-Then Statements and Assumptions

- *If X holds, then Y must also hold.*
- *Suppose that P is true; then we must have...*
- *Given that A is satisfied, it follows that...*
- *Assume that $f(x)$ is differentiable; then we can write...*
- *Under these conditions, we can conclude that...*

Definitions and Explanations

- *We define $f(x)$ as follows:*
- *The term "X" refers to...*
- *By definition, we have...*
- *Formally, a function is said to be continuous if...*
- *For the sake of clarity, we introduce the notation...*

Proofs and Justifications

- *To prove this, we proceed as follows...*
- *We now establish the claim by induction.*
- *Consider the case where...*
- *By contradiction, suppose that...*
- *This result follows directly from Theorem X.*
- *Applying Lemma Y, we obtain...*
- *Using the assumption that..., we see that...*

Comparisons and Contrasts

- *Unlike the previous case, here we find that...*
- *This result is similar to... but differs in that...*
- *In contrast to..., we now observe that...*
- *A key distinction between these cases is that...*
- *While X holds in general, it does not necessarily imply Y.*

Example and Counterexample

- *As an example, consider the function...*
- *For instance, if we take $x = 2$, then...*
- *A simple case to illustrate this is...*
- *However, the following counterexample shows that...*
- *To demonstrate that this condition is necessary, consider...*

Summarizing and Concluding

- *In summary, we have shown that...*
- *To conclude, we have established that...*
- *This completes the proof of Theorem X.*
- *The main result can be summarized as follows...*
- *Overall, these findings demonstrate that...*

Transitions Between Steps

- *Next, we consider the case where...*
- *Proceeding in a similar manner, we obtain...*
- *We now turn our attention to...*
- *Applying the previous result, we get...*
- *Rewriting the equation, we find that...*

Name	**When to Use**	**Purpose**	**Typical Use Case / Example**
Theorem	To state a main or central result	Highlight core discoveries or results	Identity for odd powers; main result of the paper
Lemma	To prove a technical or supporting result	Used as a step in proving a theorem	Symmetry of coefficients; bounds or identities needed in proof
Corollary	When a result follows immediately from a theorem or proposition	Show an obvious or elegant consequence	Special case of the main identity for fixed m; simplification when n is even
Proposition	For results of interest but not central	Formal observation or intermediate result	Recurrence for coefficients; structural property of a sum
Definition	When introducing a new term or concept	Formalize language and notation used in the paper	Definition of symmetric polynomial; custom difference operator
Remark	To provide intuition, clarification, or context	Connect ideas, explain motivation, relate to known results	Analogy with Faulhaber's formula; interpret symmetry
Example	To illustrate a result or concept	Make abstract ideas more concrete	Compute identity for n^3; verify identity for $m = 1$
Conjecture	To pose a plausible but unproven claim	Suggest direction for future work	General form for even powers; observed numerical pattern

Table 1. Guidelines for Using Mathematical Statement Types in Writing