

HOMEWORK EXAMPLE

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Throughout the semester, you will be given exercises for which you must submit your answer as a fully written and final-draft-quality document. This may be typed or handwritten. *Expect to write several drafts* before arriving at something good enough. Feedback on how to improve drafts can be obtained in office hours.

This current document serves to provide an example of what is expected and to provide a grading rubric. Observe that the example solution is written in complete, grammatical sentences with any mathematical expressions embedded into the writing. If you are unsure how to treat a mathematical expression as a grammatical object, read it out loud and follow your instinct. Expressions like ' $5x + 3$ ' are nouns and symbols like '=' or ' \leq ' are verbs.

Additional examples of how to write mathematical content can be found in Examples found in each chapter of the textbook.

Grading rubric

Score	Mathematics (25%)	Writing (75%)
0	No meaningful progress towards the correct answer	Incomprehensible. Scratch work.
1	Incorrect methods used. Major mistakes	Minor exposition, but no grammatical structure. No logical flow to response.
2	Correct methods indentified. Major mistakes.	Poor exposition and grammatical structure. Poor logical flow.
3	Correct method and minor mistakes. Good progress to the correct answer.	Clear exposition, few grammatical mistakes, and comprehensible logical flow.
4	Correct method and no mistakes.	Excellent exposition that contains to grammatical mistakes and clear logical flow.

Example:

Find the inverse of the function $f(x) = 5x^3 + 7$.

Here is a well-written solution:

Linear functions are one-to-one on the entire real line, so because $f(x)$ is linear, it has an inverse. To find it, we solve $y = 5x^3 + 7$ for x :

$$\begin{aligned} y &= 5x^3 + 7 \\ \Rightarrow y - 7 &= 5x^3 \\ \Rightarrow (y - 7)/5 &= x^3 \\ \Rightarrow \sqrt[3]{(y - 7)/5} &= x. \end{aligned}$$

Swap x & y to get

$$y = \sqrt[3]{\frac{x - 7}{5}}.$$

Therefore the inverse to f is

$$f^{-1}(x) = \sqrt[3]{\frac{x - 7}{5}}.$$

This solution is written in full sentences, each step is explained, and it can be read left-to-right and top-to-bottom. Notice that some math expressions are given a line break and centered. You may use symbols, such as ' \Rightarrow ' which means 'which implies that'.

Here is a poorly-written solution:

The handwritten work on lined paper shows the following steps:

- Original function: $f(x) = 5x^3 + 7$
- Substitution: $y = 5x^3 + 7 - 7$
- Isolation of the cubic term: $y - 7 = 5x^3$
- Division by 5: $\frac{y-7}{5} = x^3$
- Cube root extraction: $\sqrt[3]{\frac{y-7}{5}} = \sqrt[3]{x^3}$
- Solving for x: $x = \sqrt[3]{\frac{y-7}{5}}$
- Final inverse function: $f^{-1}(x) = \sqrt[3]{\frac{x-7}{5}}$ (This final expression is circled in the original image).

Even though we get the same inverse function as the well-written, this would receive a 0 grade for the *written component*. Nothing is explained and there is no discernable order to any of the steps. This is scratch work. It is a perfectly passable first draft and useful for initially solving the problem. But nobody other than the person who wrote this would be able to read it.