

# Using the Idea of Mathematical Proof to Teach Argument Structure

By Mary Dunnewold

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Most legal writing textbooks explain that in the “A” section of the IRAC (Issue, Rule, Application, Conclusion) paradigm, the analysis or argument section, the writer should apply the law to the facts and draw a conclusion. Students are usually advised to do this in a step-by-step manner. But some students need more explicit guidance about what this means and how to actually structure a law-to-facts application on the page in a way that meets the expectations of a legal reader.

In particular, many students, especially those with undergraduate backgrounds in literature or humanities, seem inclined to tell their readers everything they know, providing almost a meditation on the topic, before drawing conclusions. In fact, the conclusions sometimes seem almost secondary to the thought process. In legal writing classes, in contrast, we teach that legal writing is about helping the reader predict an outcome and decide how to proceed. Accordingly, the legal memo should focus on conclusions and omit any information that does not directly support the conclusions. But novice legal writing students don’t necessary understand how to apply that directive when writing an argument section.

In focusing on proving conclusions, legal writing is in some ways more comparable to mathematical writing than literary writing. Consequently, drawing on the idea of mathematical proof can help students understand how to structure an argument. While many students are inexperienced with sophisticated mathematical thinking, most had some exposure to the idea of mathematical proof in high school geometry. A two-column geometric proof, taught in basic high school geometry, models the thinking that a beginning

legal writer must demonstrate in the A section of the IRAC paradigm.

In a two-column geometric proof, the writer begins with a statement of the “givens” followed by a statement of the proposition to be proven. (A diagram usually precedes the givens to enhance understanding.) Following the “prove” statement, the writer then constructs a two-column proof that looks like this:

Statements	Reasons
1. Assertion	1. Support
2. Assertion	2. Support
3. Assertion	3. Support

The assertions in the two columns are numbered to correspond to each other, which ensures that each statement aligns with a reason.

So a simple geometric proof looks like this:<sup>1</sup>

Given:

Segment AD bisects segment BC.

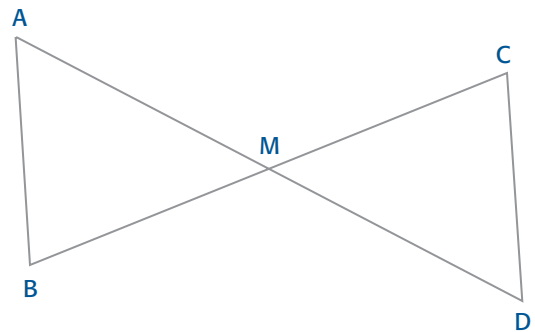
Segment BC bisects segment AD.

The definition of “bisect.”

The SAS theorem.

Prove:

Triangles ABM and DCM are congruent.



<sup>1</sup> See <[www.sparknotes.com/math/geometry3/geometricproofs/section1.html](http://www.sparknotes.com/math/geometry3/geometricproofs/section1.html)> for the basic proof idea, which has been modified here for explanatory purposes with the assistance of Professor Jeffrey Ondich, Carleton College Department of Mathematics and Computer Science.

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## Statements

## Reasons

1. Segments AM and DM are congruent.	1. Segment AD bisects segment BC, and M is the point where segments AD and BC intersect (given). Thus, by the definition of “bisect,” AM and DM are congruent.
2. Segments BM and CM are congruent.	2. Segment BC bisects segment AD, and M is the point where segments AD and BC intersect (given). Thus, by the definition of “bisect,” BM and MD are congruent.
3. Angles AMB and DMC are congruent.	3. AMB and DMC are vertical angles, by definition. Thus, by the Vertical Angles Theorem, AMB and DMC are congruent.
4. Triangles ABM and DCM are congruent.	4. Statements 1, 2, and 3 show that our diagram satisfies the hypotheses of the Side-Angle-Side Theorem. Applying the SAS Theorem, we may conclude that ABM and DCM are congruent.

Legal writing students can use this geometric proof paradigm to help them structure their arguments. First, the “given” section parallels the earlier section of the memo that establishes the relevant case facts and the applicable rule.<sup>2</sup> The “given” section that precedes the two-column proof may be quite long in a legal argument, and students need not include all the details in the diagram. But they should understand that the information in their memo that precedes the argument section is “given”—the groundwork for the argument.

Following the “given” section, students are next required to identify the main proposition they intend to prove. This is essentially the thesis sentence of their argument section. They should structure this main idea around the “phrase that pays”<sup>3</sup> central to their legal issue—the main concept at issue. Once the main proposition is stated, the two-column box is filled in. Assertions that support

the “prove” statement go in the “statements” box, and reasons that support each assertion go in the “reasons” box, with corresponding numbers.

For example, consider the issue of whether an assault conviction 20 years ago, which arose out of an arrest during a political protest, shows that a bar applicant lacks good moral character. A two-column proof on this issue might look something like this:

Given:

(1) To determine whether applicant has necessary good moral character for admission to the bar, court focuses on applicant’s overall record of conduct and whether it justifies the trust of clients and the court; court will look at applicant’s candor and remorse related to conduct, age at time of conduct, recency of conduct, seriousness of conduct, factors underlying conduct, and effect of conduct; and

(2) the application of this general rule in *Smith*, *Jones*, and *Johnson* cases; and

(3) the facts of our case.

Prove:

Our client’s past criminal conviction does not show that she lacks good moral character, and the client should therefore be admitted to the bar.

<sup>2</sup> While the substance or the meaning of the applicable rule is often not a “given,” and in fact, must be carefully constructed by synthesizing a collection of cases, we’ll assume that once constructed, the rule is a “given” for purposes of making an argument. Similarly, in geometry, certain facts are “given,” but so are certain theorems and definitions. Theorems and definitions have at some point been proven or established by someone, just as the legal rule has been established by someone.

<sup>3</sup> The legal writing community is indebted to Professor Mary Beth Beazley of Ohio State University for the invention of this handy phrase. See her book, *A Practical Guide to Appellate Advocacy* (2002), for more discussion of the “phrase that pays” idea.

“Students should follow the principle that each of the ‘statements’ in the statement column must relate back to the rule in the ‘givens’ section.”

Statements	Reasons
1. Client was candid about conviction on bar application and at all other times.	1. Facts show client revealed conviction immediately both on bar and to dean of law school. This is similar to applicant in <i>Jones</i> and different from applicant in <i>Smith</i> .
2. Factors underlying client’s conviction excuse it.	2. Facts show that client’s conviction arose from actions taken during a political protest, engaged in because of sincerely held moral beliefs. Applicants who acted for similar reasons in <i>Jones</i> and <i>Johnson</i> were still admitted to bar.
3. Conviction was not recent.	3. Facts show that conduct occurred 20 years ago. In <i>Smith</i> , “recent” criminal conduct occurred in the past few years and reflected current moral character. In <i>Jones</i> and <i>Johnson</i> , conduct was 10 or more years in past.
4. Therefore, past criminal conviction does not show that client lacks good moral character. <sup>4</sup>	4. Factors that court considers to determine effect of past acts on current moral character show current good character.

Students should follow the principle that each of the “statements” in the statement column must relate back to the rule in the “givens” section. That is, the statements should essentially be assertions about whether a particular aspect of the rule is satisfied or not. Further, the corresponding “reasons,” which explain why an assertion is satisfied, also rely on given information, such as the facts from our case and other cases. So the diagram can help students see that their arguments must rely on the information already presented, a point some students have trouble grasping.

Once students have the two-column proof diagram sketched out, they can turn the diagrammed information into a prose argument section by turning each statement/reason pair into a paragraph, beginning the entire section with the “prove” statement refashioned as the thesis sentence. To accomplish this, they should follow these steps:

1. Set out the “prove” statement, framed around the phrase that pays or main legal idea. This should be one grammatically complete sentence, the thesis sentence, and should refer explicitly to the client.
2. Set out one of the “statement” sentences as a complete, grammatical sentence. This sentence should assert a position on one of the considerations identified in the “given” rule section.
3. Provide reasons why the supporting proposition is true, usually in the form of elaboration on the facts and/or comparison of our case facts to reported case facts described in the A section. This may take several sentences and may involve more than one case comparison.
4. Draw a conclusion.
5. Repeat steps 2 through 4, in a new paragraph, for each supporting assertion you want to prove so as to support the larger main proposition. This may result in several paragraphs.
6. Repeat steps 1 through 5 for the counter analysis.

The argument section then may look like this:

*Ms. Sanders’ criminal assault conviction does not demonstrate that she currently lacks good moral character, thus she should be admitted to the Minnesota Bar. First, Sanders has been completely candid about her actions. Like the applicant in*

<sup>4</sup> For the sake of brevity, this argument does not exhaustively apply all aspects of the rule set out in the “givens” section, which a more thorough argument might do.

Jones, who was forthcoming about his conviction with the law school dean, Sanders fully reported all the required information to her law school before admission and to the Board on her application. Thus, her behavior also contrasts with that of the applicant in Smith, whose attempts to hide her conviction raised questions about her honesty.

Further, factors underlying Sanders' conduct show that her conduct does not reflect a general lack of good moral character. Sanders had good intentions when she engaged in the conduct that led to her assault conviction; she was protesting weapons production, and her protest was based on her Quaker religious beliefs. Like the applicant in Jones, who engaged in union strikes to change working conditions he sincerely objected to, Sanders sincerely believes that war is wrong and her protest activities arose from that belief. Thus, her conduct is also like the applicant's conduct in Johnson, whose convictions for trespassing and disturbing the peace all arose from his moral conviction that racial discrimination is wrong. Since both the applicants in both Jones and Johnson were found to have the requisite moral character, Sanders should also be found to have good moral character.

Sanders' actions also occurred many years ago, when she was much younger, like the activities of the applicants in Jones and Johnson. Like Jones, in particular, who attended law school as an older person with a history of protest activities, Sanders is attending law school at a time when her protest-related activities leading to arrest are far behind her. While she has not given up protesting in general, her record in the past 15 years, like Jones' record in the decade before he entered law school, casts no doubt on her character. In contrast, in Smith, the applicant's activities occurred just months before she entered law school. Therefore, Sanders' past actions do not reflect on her current good moral character and she should be admitted to the bar.

The two-column proof diagram can help students who process information visually or who have a mathematical background to more readily see argument structure. It can also help students understand that a legal argument is a system of ideas logically related to each other in a particular way, not a meditation on everything they have learned about a topic. Of course, students must continue to develop their written argument skills so they can make increasingly sophisticated legal arguments. But early in the learning process, the geometric proof diagram can help them organize their argument discussion logically.

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