

According to the National Research Council, reasoning and higher order thinking:

- Is **non-algorithmic**. The path of action is not fully satisfied in advance.
- Tends to be **complex**. The total path is not “visible” (mentally speaking) from any vantage point.
- Often yields **multiple solutions**, each with costs and benefits, rather than unique solutions.
- Involves **nuanced judgment** and interpretation.
- Involves the application of **multiple criteria**, which sometimes conflict with one another.
- Often involves **uncertainty**. Not everything that bears on the task at hand is known.
- Involves **self-regulation** of the thinking process.
- Involves **imposing meaning**, finding structure in apparent disorder.
- Is **effortful**. There is considerable mental work involved in the kinds of elaborations and judgments required.

~Jerry Johnson *Teaching and Learning Mathematics, 2000*