

## 12.04 Virtual Lecture Notes (Part 1a)

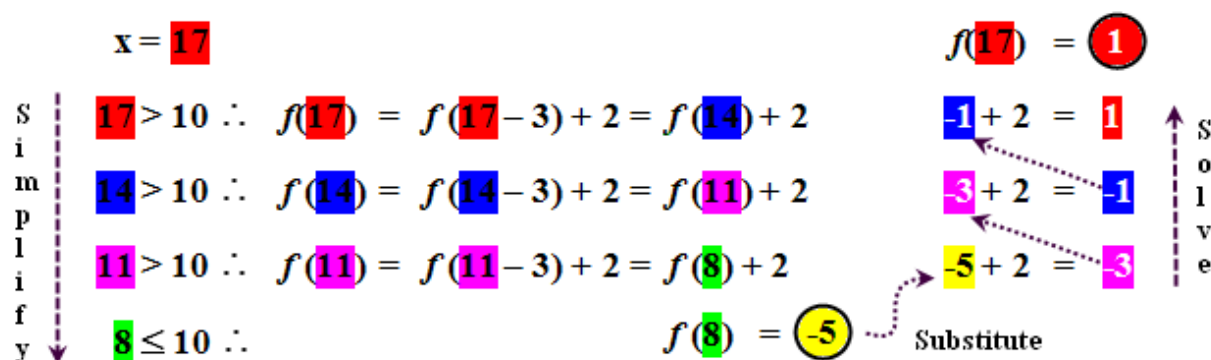
While you are developing the recursive leap of faith, you will want to be able to trace through recursive methods. Solving Piecewise functions such as the one shown below provides good practice for improving your tracing skills. A simple graphic organizer is suggested for solving these kinds of expressions, to help you keep track of all the steps. Using colored markers to highlight the flow of numbers through the process can also be helpful.

For example, how would you solve the following expression for  $x = 17$ ?

$$f(x) = \begin{cases} f(x-3) + 2 & \text{if } x > 10 \\ -5 & \text{if } x \leq 10 \end{cases}$$

You can find the answer to a Piecewise function by using the S-S-S algorithm: Simplify, Substitute, and Solve.

- **Simplify** the expression through a series of intermediate calculations (as shown on the left) until the base case is reached.
- **Substitute** the base case in the last unsolved expression.
- **Solve** the remaining unsolved expressions until the final answer is found.



Simplify, Substitute, and Solve is a pattern you can use to evaluate any Piecewise function.