Definition: Semitone Integer Notation

- *Is a notational system so that for any two notes $\widehat{x}, \widehat{y} \in \mathbb{W}$ (written in Note Integer Notation), we denote the number of semitones between the two notes as an integer.*
  - *So instead of saying, $\widehat{y}$ is a perfect 5th above $\widehat{x}$, we would say $\widehat{y}$ is seven above $\widehat{x}$, and write $\widehat{x} + 7 = \widehat{y}$*
- *Since $\widehat{x}, \widehat{y}$ are written in NIN, we have that for any $\alpha \in \mathbb{Z}$ that the note $\widehat{x} + \alpha = (\widehat{x + \alpha})$*
- *In general the interval which must be added to $\widehat{x}$ to get to $\widehat{y}$ is $y - x$*
  - *From the above it holds:*

$$\widehat{x} + (y - x) = (\widehat{x + y - x}) = \widehat{y}$$

Examples

- *If $x = 5$ and $y = 9$, then the interval which must be added is $9 - 5 = 4$*
- *It's also possible for it to be a negative number, if $x = 11$ and $y = 2$, then you have to add $2 - 11 = -9$ semitones to $\widehat{x}$ to get to $\widehat{y}$, this corresponds to moving down 9 semitones*