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## cone

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Given a topological space  $X$ , the *cone on  $X$*  (sometimes denoted by  $CX$ ) is the quotient space  $X \times [0, 1] / X \times \{0\}$ . Note that there is a natural inclusion  $X \hookrightarrow CX$  which sends  $x$  to  $(x, 1)$ .

If  $(X, x_0)$  is a based topological space, there is a similar *reduced cone* construction, given by  $X \times [0, 1] / (X \times \{0\}) \cup (\{x_0\} \times [0, 1])$ . With this definition, the natural inclusion  $x \mapsto (x, 1)$  becomes a based map, where we take  $(x_0, 0)$  to be the basepoint of the reduced cone.