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For a domain  $R$ , denote by  $|S(R)|$  the number of star operations on  $R$ . It is well known that if  $R$  is a valuation domain, then  $|S(R)| \leq 2$ , with equality holding if and only if the maximal ideal of  $R$  is not principal. We attempt to compute the number of star operations in a few other cases. For example, we show that if  $R$  is a pseudo-valuation domain such that  $R$  has residue field  $k$  and its associated valuation overring has residue field  $K$ , then  $|S(R)| = 2$  if and only if  $[K : k] = 3$ . (Received February 09, 2009)