1) houses (m) = 2000

features (n) = 15

a) Total Count of elements in the Matrix A

$2000 \times 15 = 30,000$

b) SVD on the matrix

U = left matrix

Σ = Sigma

V = right matrix

$A = 2000 \times 15 = 30,000$

$U = 2000 \times 2000 = 4,000,000$

$V^T = 15 \times 15 = 225$

$\Sigma = 2000 \times 15 = 30,000$

Total no of elements required for SVD

$= 4,000,000 + 30,000 + 225$

$= 4,030,225$

c) SVD with $k = 5$ Components

No of elements we need to preserve

$A = 2000 \times 15 = 30,000$

$U = 2000 \times 5 = 10,000$

$V = 5 \times 15 = 75$

$\Sigma = 5 \times 5 = 25$

Total elements required to preserve

$U + \Sigma + V$

$= 10,000 + 25 + 75$

$= 10,100$ elements