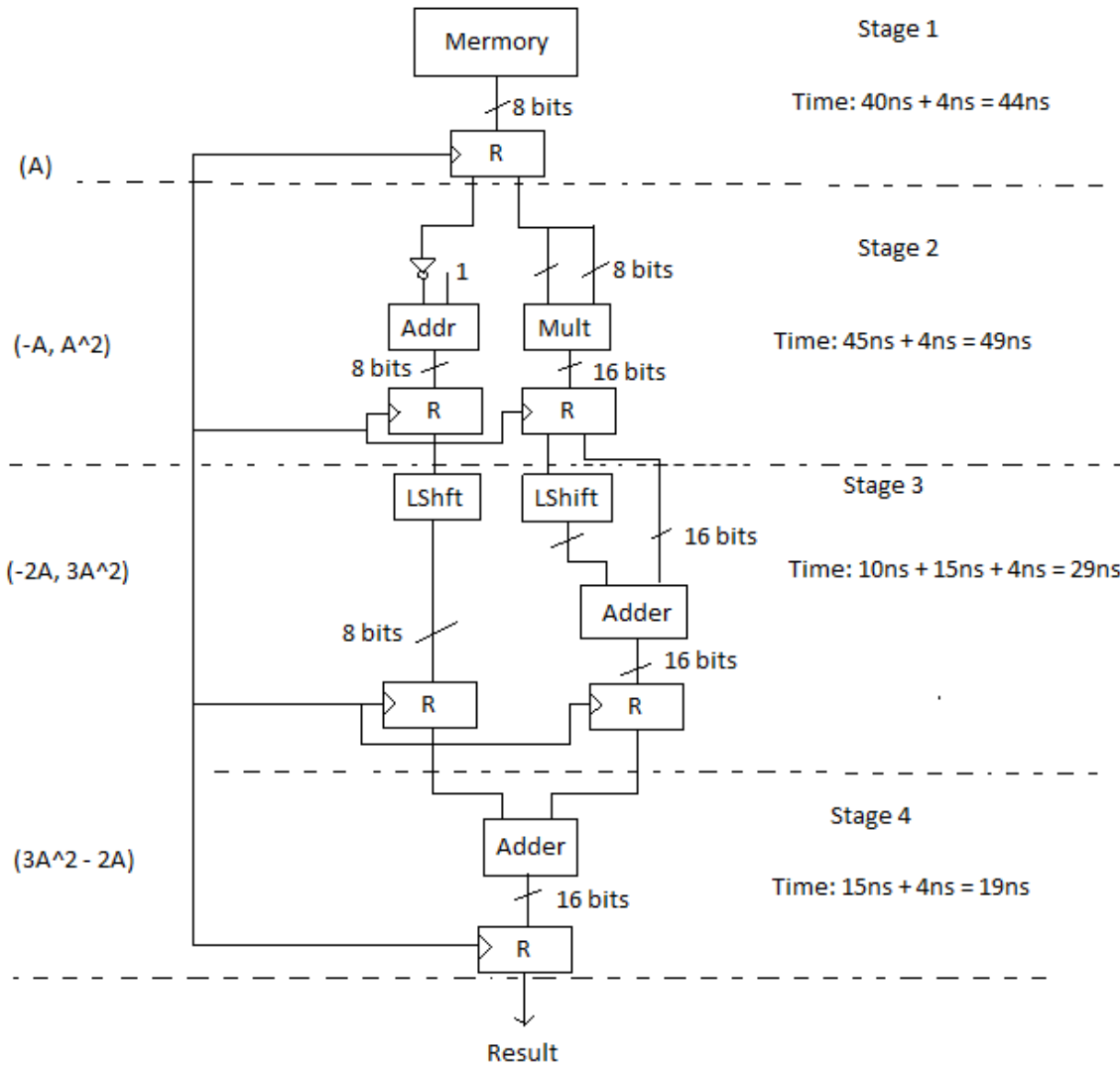


a)



b)

The required time for the slowest stage is 49ns so, the clock cycle is 49ns.

8 member array;

Without pipeline required time is: $8 * (40\text{ns} + 45\text{ns} + 25\text{ns} + 15\text{ns}) = 125\text{ns} * 8 = 1000$

With pipeline required time is: $49 * 4 + 49 * 7 = 539\text{ns}$

Speedup = $1128 / 539 = 1.85$

Infinite number of elements;

Speedup = $t_n / t_p = 125 / 49 = 2.55$

c)

The theoretical speed up is the number of stages. $S_{\text{max}} = k = 4$