1. States : $\{q_0, q_1, q_2, q_3, q_4, q_5, q_6\}$
input alphabet : $\{a, b\}$
tape alphabet : $\{a, b, y, k, z\}$
blank symbol : $\sqcup$
initial state : q_0
final state : $\{q_5\}$

transitions

$\delta(q_0, a) = (q_1, blank, R)$

$\delta(q_0, y) = (q_6, y, R)$

$\delta(q_1, a) = (q_1, a, R)$

$\delta(q_1, y) \quad (q_1, y, R)$

$\delta(q_1, b) = (q_2, y, R)$

$\delta(q_2, b) = (q_2, b, R)$

$\delta(q_2, z) = (q_2, b, R)$

$\delta(q_2, a) = (q_3, z, R)$

$\delta(q_3, a) = (q_3, a, R)$

$\delta(q_3, k) = (q_3, k, R)$

$\delta(q_3, b) = (q_4, k, L)$

$\delta(q_4, a) = (q_4, a, L)$

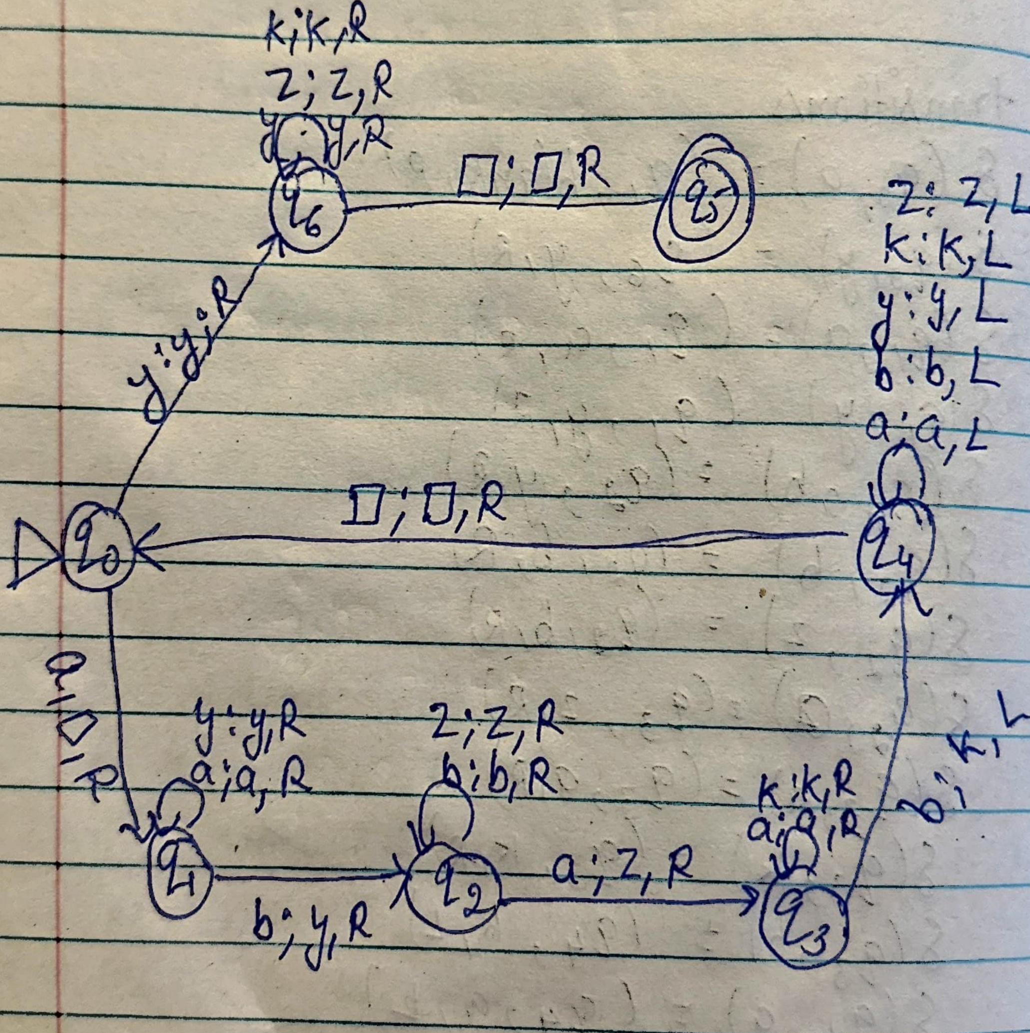
$\delta(q_4, b) = (q_4, b, L)$

$\delta(q_4, y) = (q_4, y, L)$

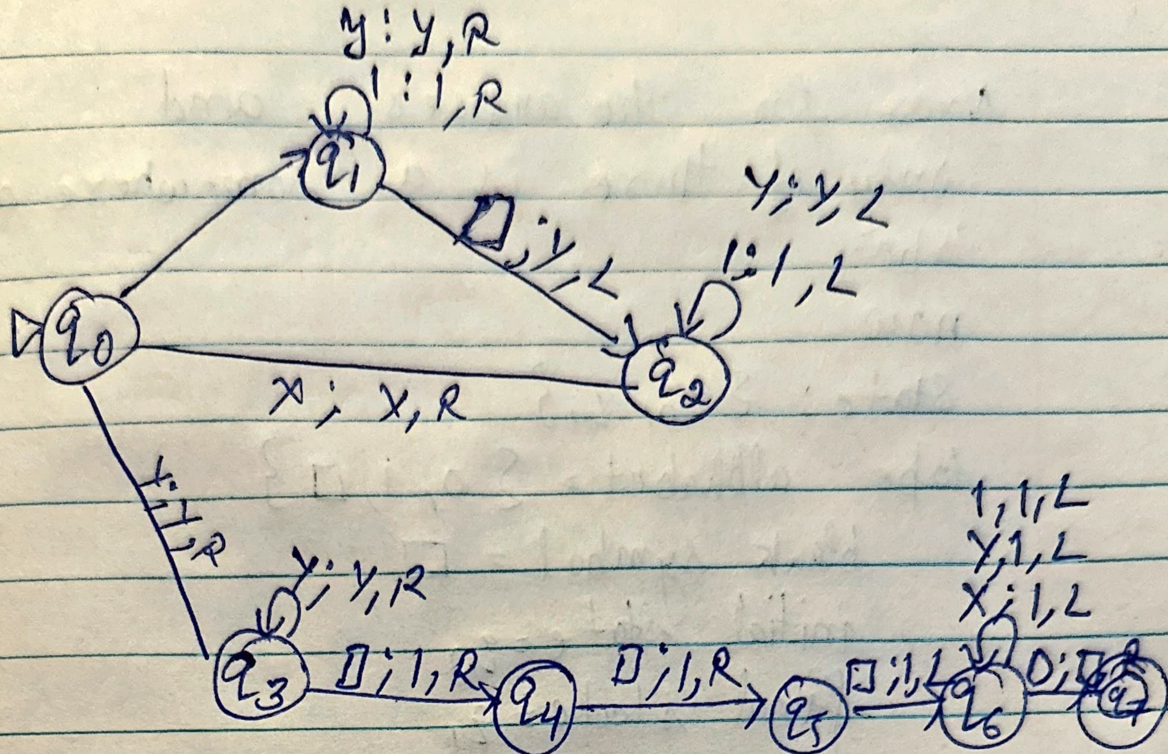
$\delta(q_4, k) = (q_4, k, L)$

$\delta(q_4, z) = (q_4, z, L)$

$\delta(q_4, \text{blank}) = (q_0, \text{blank}, R)$
$\delta(q_6, k) = (q_6, k, R)$
$\delta(q_6, z) = (q_6, z, R)$
$\delta(q_6, y) = (q_6, y, R)$
$\delta(q_6, \text{blank}) = (q_3, \text{blank}, R)$

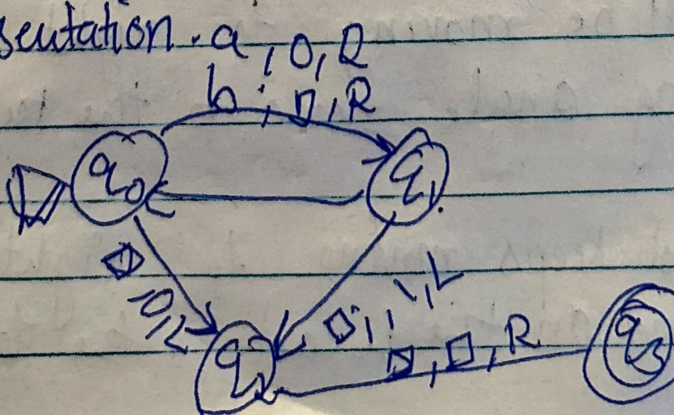


(2)



Initial state = q_0
final state = q_7
States = $\{q_0, q_1, q_2, q_3, q_4, q_5, q_6, q_7\}$
alphabet = $\{x, y, 1, L\}$
blank symbol □

3 $f(n) = 2x+3$
Then x will be positive inter
representation.



Now, for the answer and only if there is a somewhere on tape.

now

State: $\{q_0, q_1\}$

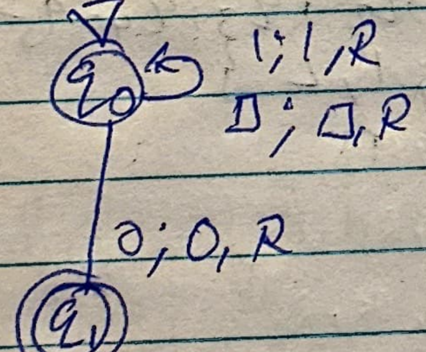
tape alphabet = $\{0, 1, \square\}$

blank symbol = $\square$

initial state = q_0

final state = q_1

The required taping machine is inbuilt with states:



q_0 will be moving to right unless the proceding angle zero to the tape.

→ The head keeps moving to right until a 0 is found on the head on the tape (q_0) 1; 1, R