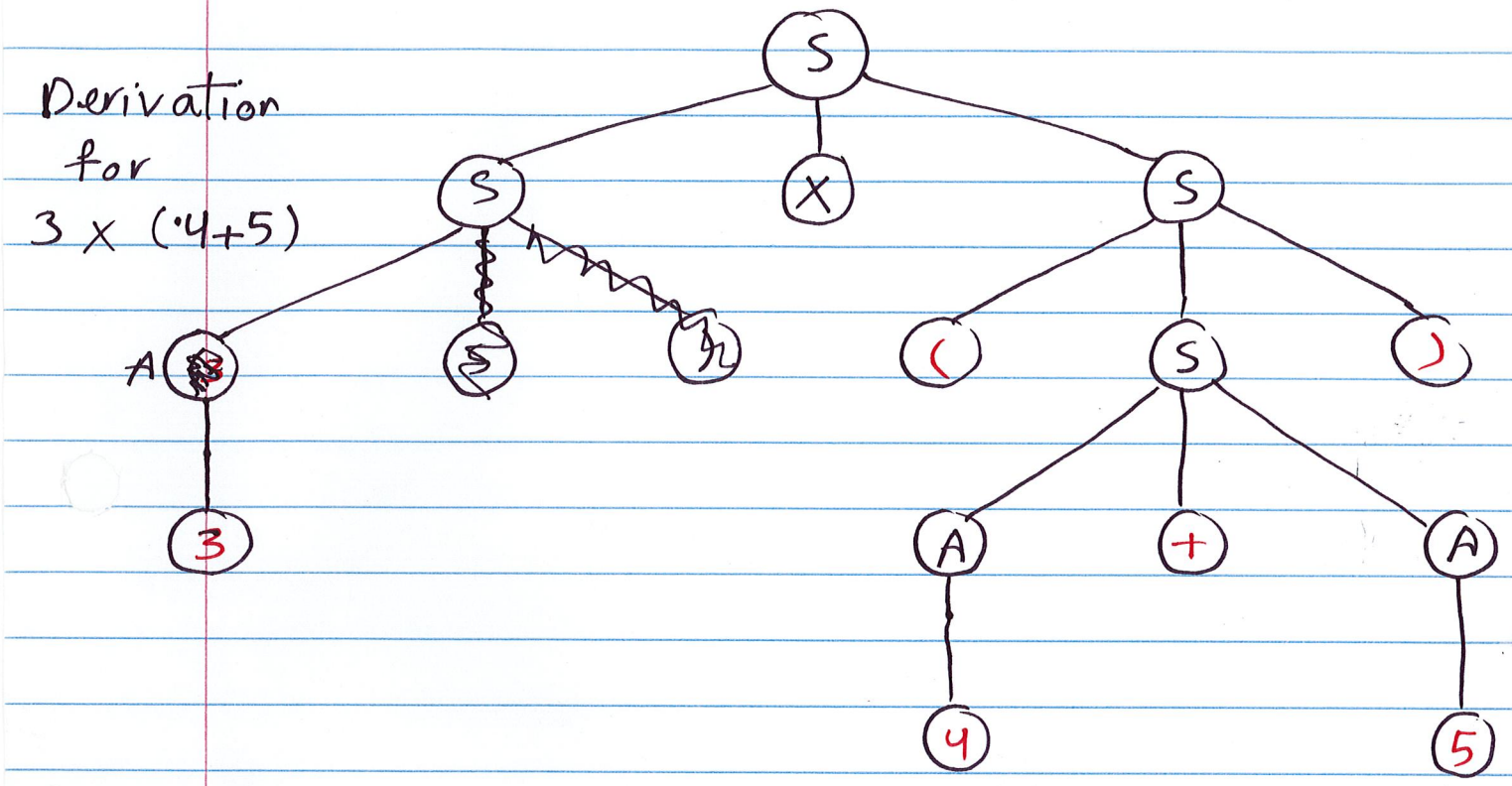
(1)

Example for Ambiguity of CFG

grammar(1): $S \rightarrow S \times S \mid S + S \mid (S) \mid A$

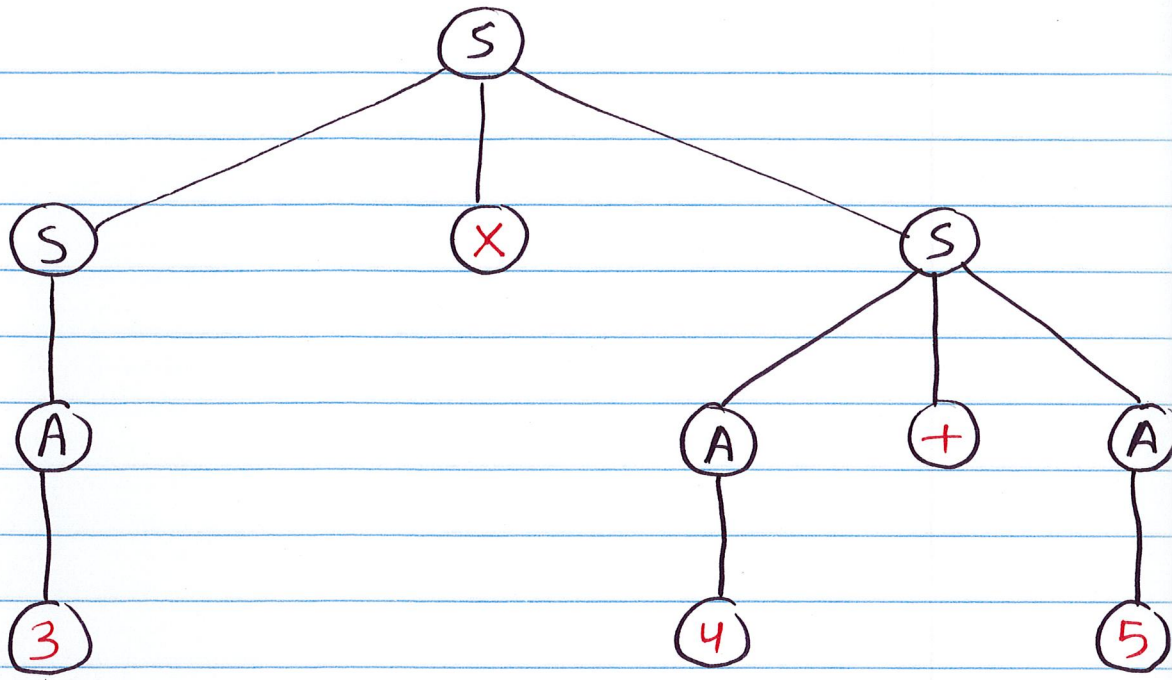
$A \rightarrow AA \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$

Derivation for $3 \times (4+5)$

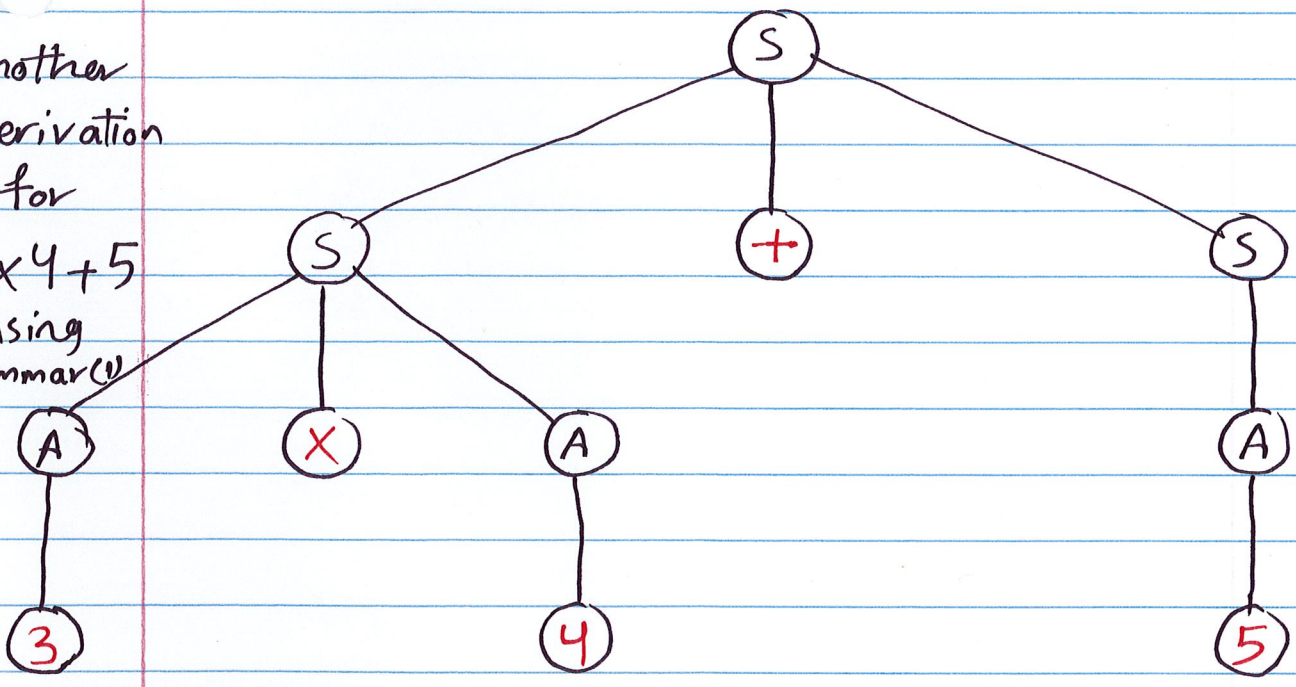


(2)

Derivation for $3 \times 4 + 5$ using grammar (1)



Another Derivation for $3 \times 4 + 5$ using grammar (1)



Hence, grammar (1) is ambiguous

(3)

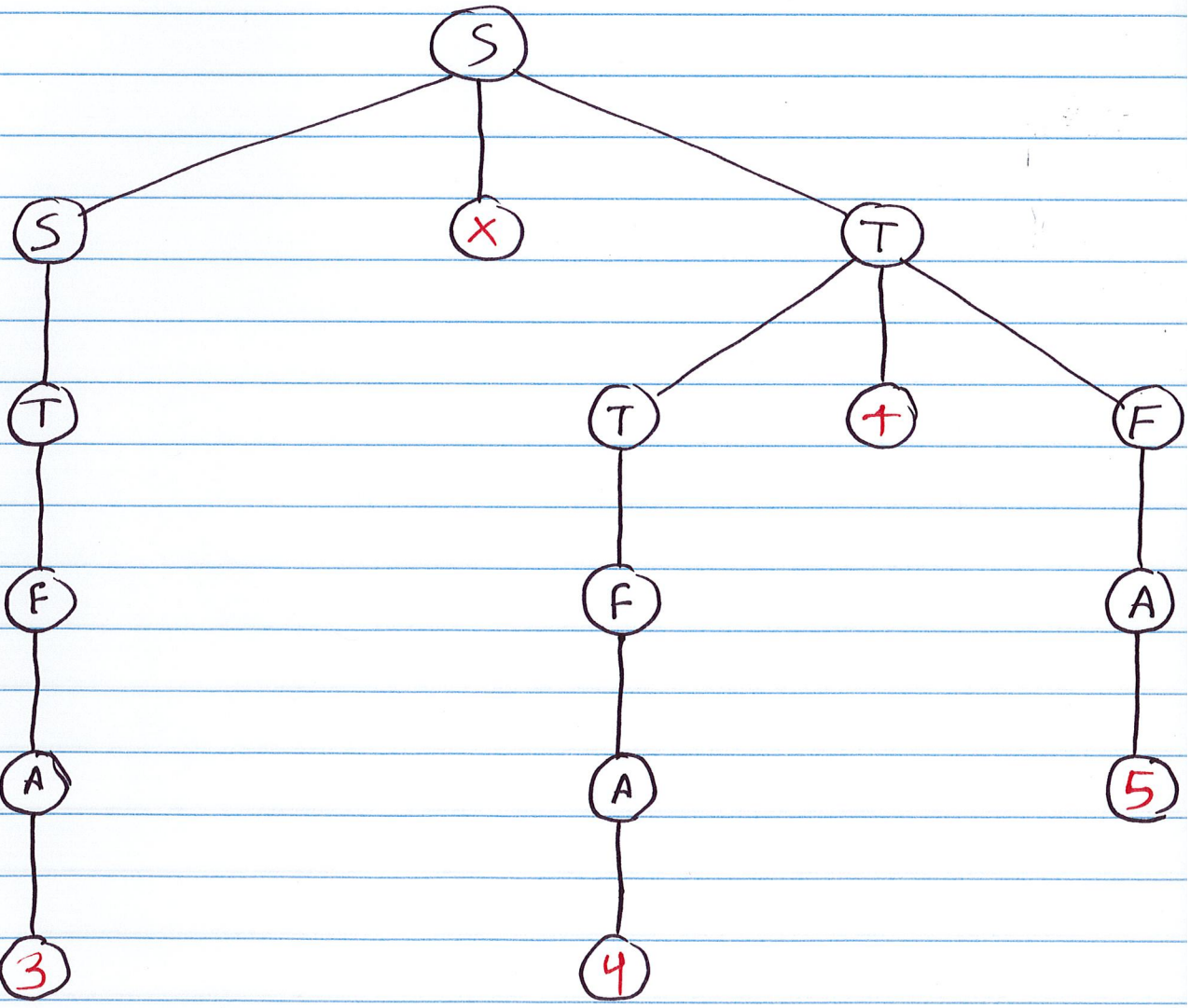
grammar(2): $S \rightarrow S + T \mid T$

$T \rightarrow T \times F \mid F$

$F \rightarrow (S) \mid A$

$A \rightarrow AA \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$

the only Derivation for $3 \times 4 + 5$ using grammar(2)



grammar(2) is unambiguous

(4) The only Derivation for the following string using grammar (2) which is an unambiguous grammar (hence the only Derivation)

$2 + (1 \times 9) + 3 \times 4 + (8 \times 7 \times 16)$