CS 463: Quiz 2: Defining Languages
Spring 2024 **CLOSED NOTES**

Name Answer Key
G#:

Here a language is described – **S** is the start symbol, the terminals are {**+,–,/,1,2,3,4,(,)**}, and the non-terminals are {**S,E,N**}. The production rules are below. Use it in all the following questions.

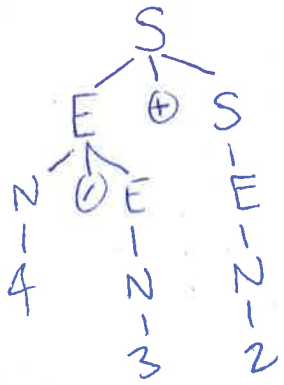
S ⟶ E + S | E – S | E
E ⟶ N / E | N
N ⟶ (S) | 1 | 2 | 3 | 4

1. **(1pt).** The associativity of – is: left (right) neither
2. **(1pt).** The associativity of **/** is: left (right) neither
3. **(1pt).** The precedence of **–** is (lower than) the same as, higher than that of **/** here.

4. **(1pt).** Is the language ambiguous? Yes (No)
5. **(0.5pt).** Is the sentence **2+3/4** in the language? (Yes) No
6. **(0.5pt).** Is the sentence **2/(3–4)** in the language? (Yes) No

7. **(2.5pt).** Draw a parse tree for the sentence:

4/3+2



8. **(2.5pt).** Write out a **leftmost** derivation of the sentence: **4/3+2**

S
==> E + S
⇒ N / E + S
⇒ 4 / E + S
⇒ 4 / N + S
⇒ 4 / 3 + S
⇒ 4 / 3 + E
⇒ 4 / 3 + N
⇒ 4 / 3 + 2