

**Write your name here:** \_\_\_\_\_

For problems 1, 2, and 3, you may give answers only.

1. True or false: If  $L$  is a CFL and  $R$  is a regular set, then  $L \cap R$  must be a regular set.

2. True or false: If  $L$  is a CFL, then the complement of  $L$  (i.e.,  $\Sigma^* - L$ ) is a CFL.

3. True or false:  $L = \{a^n b^m \mid n, m \geq 0 \text{ and } n - m = 5\}$  is a CFL.

4. Convert the following CFG to a CFG in Chomsky normal form.

$$\begin{aligned} S &\rightarrow aSC \mid C \mid \epsilon \\ C &\rightarrow CCC \mid ba \end{aligned}$$