

Problem

For each of the following languages, give two strings that are members and two strings that are *not* members—a total of four strings for each part. Assume the alphabet $\Sigma = \{a, b\}$ in all parts.

a. a^*b^*

b. $a(ba)^*b$

c. $a^* \cup b^*$

d. $(aaa)^*$

e. $\Sigma^*a\Sigma^*b\Sigma^*a\Sigma^*$

f. $aba \cup bab$

g. $(\epsilon \cup a)b$

h. $(a \cup ba \cup bb)\Sigma^*$

Step-by-step solution

Step 1 of 8

(a) Language is $L = a^*b^*$ over the alphabet $\Sigma = \{a, b\}$

• Strings that are member of L

(i) ab

(ii) abb

• Strings that are not members of L

(i) ba

(ii) bba

[Comments \(3\)](#)

Step 2 of 8

(b) Language is $L = a(ba)^*b$ over $\Sigma = \{a, b\}$

• Strings that are members of L

(i) $abab$

(ii) $ababab$

• Strings that are not members of L

(i) aba

(ii) bab

[Comments \(4\)](#)

Step 3 of 8

(c) Given language is $L = a^* \cup b^*$ over $\Sigma = \{a, b\}$

• Strings that are members of L

(i) aaa

(ii) bbb

• Strings that are not members of L

(i) $baab$

(ii) $bbaa$

[Comments \(4\)](#)

Step 4 of 8

(d) Given language is $L = (aaa)^*$ over alphabet $\Sigma = \{a, b\}$

• Strings that are members of L

(i) aaa

(ii) $aaaaaa$

• Strings that not members of L

(i) a

(ii) $aaaaa$

[Comments \(3\)](#)

Step 5 of 8

(e) Given language is $L = \Sigma^* a \Sigma^* b \Sigma^* a \Sigma^*$ over $\Sigma = \{a, b\}$

• Strings that are members of L

(i) aba

(ii) $aabbaa$

• Strings that over not members of L

(i) a

(ii) b

[Comments \(1\)](#)

Step 6 of 8

(f) Given language is $L = aba \cup bab$ over $\Sigma = \{a, b\}$

• Strings that are members of L

(i) aba

(ii) bab

• Strings that over not members of L

(i) abb

(ii) ba

[Comments \(5\)](#)

Step 7 of 8

(g) Given language is $L = (\epsilon \cup a)b$ over $\Sigma = \{a, b\}$

• Strings that are members of L

(i) b

(ii) ab

• Strings that are not members of L

(i) a

(ii) ba

[Comments \(1\)](#)

Step 8 of 8

(h) Given language is $L = (a \cup ba \cup bb)\Sigma^*$ over $\Sigma = \{a, b\}$

• Strings that are members of L

(i) a

(ii) $bbab$

• Strings that are not members of L

(i) b

(ii) ϵ

[Comments \(4\)](#)