A grammar is ambiguous if

A. the same nonterminal appears twice on the right side of some production rule
B. there are two production rules with the same nonterminal on the left side
C. there are two derivations of some terminal string
D. there is some terminal string with two distinct parse trees
E. the right side of some production rule has more than one nonterminal

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Most operators in math are

A. Left-associative
B. Right-associative
C. Non-associative

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Which one of the following is true of E-BNF grammars?

A. E-BNF grammars allow one to describe the semantics of a programming language
B. Any E-BNF grammar can also be expressed in a BNF grammar
C. E-BNF grammars allow one to describe the syntax that cannot be described by BNF grammars

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Clicker: For input "2.3$", what would be the list of tokens returned by the example lexer in class?

A. INT('2') INVALID('.') INT('3') EOI
B. FLOAT('2.3') EOI
C. FLOAT('2.3')
D. FlOAT('2.') INT('3') EOI

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For input "x2 := 3.$", what would be the list of tokens returned by the example lexer in class?

A. ID('x') INT('2') ASSIGNMENTOP FLOAT('3.') EOI
B. ID('x') INT('2') ASSIGNMENTOP INVALID('3.') EOI
C. ID('x2') ASSIGNMENTOP INVALID('3.') EOI
D. ID('x2') ASSIGNMENTOP FLOAT('3.') EOI

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Clicker: Regexp aa* matches the empty string.

A. Yes
B. No

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Which one of the following string is NOT matched by a(a*|b*)?

A. a
B. aababab
C. abbb
D. aaaa

Which one of the following string is NOT matched by a(a|b)*?

A. a
B. aababab
C. abababa
D. abbbaabb
E. None of the above

Example

```
•(1)
•(2)    • { int x = … ;
•(3)    •        {  int y = … ;
        •              {  int x = …
               ;
•(4)    •              ….
•(5)    •           };
•(6)    •        };
        • };
```

Clicker: The scope of inner x is?

A. (1) to (6)
B. (2) to (5)
C. (3) to (4)
D. (1) to (3) and (4) to (6)
E. (1) to (2) and (5) to (6)

Clicker: The lifetime of inner x is?

A. (1) to (6)
B. (2) to (5)
C. (3) to (4)
D. (1) to (3) and (4) to (6)
E. (1) to (2) and (5) to (6)

Clicker: The scope of outer x is?

A. (1) to (6)
B. (2) to (5)
C. (3) to (4)
D. (1) to (3) and (4) to (6)
E. (1) to (2) and (5) to (6)

Clicker: The lifetime of outer x is?

A. (1) to (6)
B. (2) to (5)
C. (3) to (4)
D. (1) to (3) and (4) to (6)
E. (1) to (2) and (5) to (6)

Example

◆C static local variables

```
void foo(void) {
    static int first=1; /* first is true */
    if (first) {
        first = 0; ...
    } else { ... }
}
```

Clicker: What is the lifetime of first?

A. During the time when foo is executed
B. The whole program execution time
C. During the time when a caller of foo is executed
D. None of the above