SUGGESTED SKILLS

2.B

Determine the result or output based on statement execution order in a code segment without method calls (other than output).

4.B

Identify errors in program code.

AVAILABLE RESOURCE

- Runestone Academy: AP CSA—Java Review: 2.1—What is Java?

TOPIC 1.1
Why Programming? Why Java?

Required Course Content

ENDURING UNDERSTANDING

MOD-1

Some objects or concepts are so frequently represented that programmers can draw upon existing code that has already been tested, enabling them to write solutions more quickly and with a greater degree of confidence.

LEARNING OBJECTIVE

MOD-1.A

Call `System` class methods to generate output to the console.

ESSENTIAL KNOWLEDGE

MOD-1.A.1

`System.out.print` and `System.out.println` display information on the computer monitor.

MOD-1.A.2

`System.out.println` moves the cursor to a new line after the information has been displayed, while `System.out.print` does not.

ENDURING UNDERSTANDING

VAR-1

To find specific solutions to generalizable problems, programmers include variables in their code so that the same algorithm runs using different input values.

LEARNING OBJECTIVE

VAR-1.A

Create string literals.

ESSENTIAL KNOWLEDGE

VAR-1.A.1

A string literal is enclosed in double quotes.

TOPIC 1.2
Variables and Data Types

Required Course Content

ENDURING UNDERSTANDING

VAR-1

To find specific solutions to generalizable problems, programmers include variables in their code so that the same algorithm runs using different input values.

LEARNING OBJECTIVE	ESSENTIAL KNOWLEDGE
VAR-1.B Identify the most appropriate data type category for a particular specification.	VAR-1.B.1 A type is a set of values (a domain) and a set of operations on them. VAR-1.B.2 Data types can be categorized as either primitive or reference. VAR-1.B.3 The primitive data types used in this course define the set of operations for numbers and Boolean values.
VAR-1.C Declare variables of the correct types to represent primitive data.	VAR-1.C.1 The three primitive data types used in this course are `int`, `double`, and `boolean`. VAR-1.C.2 Each variable has associated memory that is used to hold its value. VAR-1.C.3 The memory associated with a variable of a primitive type holds an actual primitive value. VAR-1.C.4 When a variable is declared `final`, its value cannot be changed once it is initialized.

SUGGESTED SKILLS

1.A
Determine an appropriate program design to solve a problem or accomplish a task.

1.B
Determine code that would be used to complete code segments.

AVAILABLE RESOURCE

- Runestone Academy: AP CSA—Java Review: 3—Variables

SUGGESTED SKILLS

1.B
Determine code that would be used to complete code segments.

2.A
Apply the meaning of specific operators.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 3.5—Operators
- Problets: Arithmetic Expressions in Java

TOPIC 1.3
Expressions and Assignment Statements

Required Course Content

ENDURING UNDERSTANDING

CON-1
The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.A
Evaluate arithmetic expressions in a program code.

ESSENTIAL KNOWLEDGE

CON-1.A.1
A literal is the source code representation of a fixed value.

CON-1.A.2
Arithmetic expressions include expressions of type `int` and `double`.

CON-1.A.3
The arithmetic operators consist of `+`, `-`, `*`, `/`, and `%`.

CON-1.A.4
An arithmetic operation that uses two `int` values will evaluate to an `int` value.

CON-1.A.5
An arithmetic operation that uses a `double` value will evaluate to a `double` value.

CON-1.A.6
Operators can be used to construct compound expressions.

CON-1.A.7
During evaluation, operands are associated with operators according to operator precedence to determine how they are grouped.

CON-1.A.8
An attempt to divide an integer by zero will result in an `ArithmeticException` to occur.

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Primitive Types

LEARNING OBJECTIVE

CON-1.B

Evaluate what is stored in a variable as a result of an expression with an assignment statement.

ESSENTIAL KNOWLEDGE

CON-1.B.1

The assignment operator (=) allows a program to initialize or change the value stored in a variable. The value of the expression on the right is stored in the variable on the left.

CON-1.B.2

During execution, expressions are evaluated to produce a single value.

CON-1.B.3

The value of an expression has a type based on the evaluation of the expression.

SUGGESTED SKILLS

2.B

Determine the result or output based on statement execution order in a code segment without method calls (other than output).

5.A

Describe the behavior of a given segment of program code.

AVAILABLE RESOURCE

- Runestone Academy: AP CSA—Java Review: 3.5—Operators

TOPIC 1.4
Compound Assignment Operators

Required Course Content

ENDURING UNDERSTANDING

CON-1

The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.B

Evaluate what is stored in a variable as a result of an expression with an assignment statement.

ESSENTIAL KNOWLEDGE

CON-1.B.4

Compound assignment operators (+=, −=, *=, /=, %=) can be used in place of the assignment operator.

CON-1.B.5

The increment operator (++) and decrement operator (−−) are used to add 1 or subtract 1 from the stored value of a variable or an array element. The new value is assigned to the variable or array element.

X EXCLUSION STATEMENT—(EK CON-1.B.5): The use of increment and decrement operators in prefix form (i.e., ++x) and inside other expressions (i.e., arr[x++]) is outside the scope of this course and the AP Exam.

TOPIC 1.5
Casting and Ranges of Variables

SUGGESTED SKILLS

2.B

Determine the result or output based on statement execution order in a code segment without method calls (other than output).

5.B

Explain why a code segment will not compile or work as intended.

AVAILABLE RESOURCE

- Runestone Academy: AP CSA—Java Review: 3.6—Casting

Required Course Content

ENDURING UNDERSTANDING

CON-1

The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.C

Evaluate arithmetic expressions that use casting.

ESSENTIAL KNOWLEDGE

CON-1.C.1

The casting operators `(int)` and `(double)` can be used to create a temporary value converted to a different data type.

CON-1.C.2

Casting a `double` value to an `int` causes the digits to the right of the decimal point to be truncated.

CON-1.C.3

Some programming code causes `int` values to be automatically cast (widened) to `double` values.

CON-1.C.4

Values of type `double` can be rounded to the nearest integer by `(int)(x + 0.5)` or `(int)(x – 0.5)` for negative numbers.

CON-1.C.5

Integer values in Java are represented by values of type `int`, which are stored using a finite amount (4 bytes) of memory. Therefore, an `int` value must be in the range from `Integer.MIN_VALUE` to `Integer.MAX_VALUE` inclusive.

CON-1.C.6

If an expression would evaluate to an `int` value outside of the allowed range, an integer overflow occurs. This could result in an incorrect value within the allowed range.