

AP CS Semester Review Sheets: Creating Random Ranges:

Math.random() generates pseudo-random numbers, a `double` between 0 (inclusive) and 1(exclusive). It can be used to generate an random range of integers by appropriate multiplication and casting the product to an (int).

AP Exam Quick Reference Syntax sheet :

```
class java.lang.Math
```

- `static double random()` // returns a double in the range **[0.0, 1.0)**

A. Which of these assignments are valid uses of **Math.random()**? And for those that are valid, what is the Minimum, Maximum, and a few other sample values assigned to its variable?

- a) `int a = Math.random();`
___ Valid / ___ Invalid
Min: _____, Max: _____, Other Values: _____
- b) `double b = Math.random();`
___ Valid / ___ Invalid
Min: _____, Max: _____, Other Values: _____
- c) `int c = Math.random(15);`
___ Valid / ___ Invalid
Min: _____, Max: _____, Other Values: _____
- d) `int d = (int) Math.random() * 10;`
___ Valid / ___ Invalid
Min: _____, Max: _____, Other Values: _____
- e) `int e = (int) (Math.random() * 8);`
___ Valid / ___ Invalid
Min: _____, Max: _____, Other Values: _____
- f) `int f = (int) Math.ceil(Math.random() * 6);`
___ Valid / ___ Invalid
Min: _____, Max: _____, Other Values: _____

B. Write an expression that will generate a random integer value from 0 to 4 (both inclusive).:

```
int ran0To4 = _____;
```

C. Now Write an expression that will generate a random integer value from 1 to 5 (both inclusive):

```
int ran1To5 = _____;
```

D. Can you write a different expression that will generate a random integer value from 1 to 5 (both inclusive)?

```
int aran1To5 = _____;
```

E. Can you write an expression that will generate a random integer value from 4 to 9 (both inclusive)?

```
int ran4To9 = _____;
```

After correcting this side, then turn over

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Generalizing Solutions:

F. Why is it especially important to generate random integers? Why can't we just use a double value?

G. Write a General Expression that will generate a random integer from zero (0) to a variable value n where n is an integer; for example, `int n = 4;` would generate a random integer number from 0 to 4 (both inclusive).

```
int ran0ToN = _____;
```

H. Write a General Expression that will generate a random integer from one (1) to a variable value n where n is an integer; for example, `int n = 4;` would generate a random integer number from 1 to 4 (both inclusive)..

```
int ran1ToN = _____;
```

I. Write a General Expression that will generate a random integer from variable value x to the variable value y where both are is an integer, for example, `int x = 4; int y = 9;` would generate a random integer number from 4 to 9 (both inclusive).

```
int ranXToY = _____;
```

Putting it together:

I. How would you create a few lines of code that would display a random letter from a string? Fill in the blanks:

```
String word = "Garfield";
```

```
int i = _____;
```

```
_____ letter = _____;
```

```
System.out.println("A Random Letter from " + word + " is " + letter);
```

Here are a few String Methods to help you out, where "s" is the String:

```
s.length() // number of characters in this string
```

```
s.substring(index1, index2) // the characters from index1 (inclusive)  
                           // to index2 (exclusive);
```

```
s.charAt(int) // accepts an int index parameter and returns the  
              // char at that index location
```