1. (40pts) Fill out the following table. Evaluate the Java expression in the first column and put the result in the second column. Assume that each expression is evaluated independently (i.e., not in sequence). In the third column indicate the datatype of the result. The first row has been done for you.

(Note: you *can* answer these questions using the Java compiler, and if you do this, you will miss out on a chance to learn. You will be asked to do similar problems on the midterm and you *will not* have access to a Java compiler. I *do* recommend you write these statements inside a Java program after you have done the homework. You can check your answers --- if you have errors, understand why.)

You have the following variables declared and initialized:

- `double a = 13.0, b = 6.0;`
- `int i = 13, j = 6;`

<table>
<thead>
<tr>
<th>Java expression</th>
<th>Result</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>i + j</code></td>
<td>15</td>
<td>int</td>
</tr>
<tr>
<td><code>a - b * 2 - j</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>a / b</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>a / i</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>i / j</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>i % j</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>1.0 * i / j</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>b - j / a - i</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>(i - 1) / j + + a</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>i % 5 + a % 2</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>(++a) + (++b)</code></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* Java has the the *unary + operator* that returns the same value (identity operation). E.g.: `+3` evaluates to `3`
2. (10 pts) The Java Language Documentation
   a) Access the Java API documentation from the class website. It is linked in the left hand sidebar.
   b) In the Java docs, look in the top left corner of the page for a list of packages. For each package
      listed below, write down the first sentence of the package description, and report how many
      classes it contains. (Just count classes, not interfaces, exceptions, or whatever else.)
      • Example: `java.awt.color`: Provides classes for color spaces.
      5 classes (ColorSpace, ICC_ColorSpace, ICC_Profile, ICC_ProfileGray and
      ICC_ProfileRGB --- you don’t need to list them. I did it to show you what to look for to
      find the correct answer).
      • `javax.print`

      • `java.nio`

      • `java.security`

      • `java.util.jar`
3. (30 pts) Question3 Program: Write a Java program that reads in a double typed number and prints its square (i.e., multiplies the number with itself). Name your program Question3.
4. (20 pts) Look up the java.lang.Math class in the Java documentation.
   a) (5 pts) List all the methods named max (give the method signatures/headers).

   b) (5 pts) Why is there more than one method?

c) (10 pts) You are given 3 int typed variables named $x$, $y$, and $z$.
   The expression: \texttt{Math.max(x, y)} will return the maximum (largest) of the two values stored in $x$ and $y$.

   Using the max method, write a single Java statement which defines an int typed variable, $a$, whose value is set to the maximum of $x$, $y$, and $z$.

   Hint: You can nest functions so that the output of one function is the input to another function. For example: the square root of the square root of 16 would be \texttt{Math.sqrt( Math.sqrt( 16.0 ) )}

   and this expression would evaluate to 2.0.

   Remember that statements can use operators, values, and the results (return values) from functions. Begin with the basic assignment statement

   \texttt{int a = ...;}

   and then complete the right hand side of the statement with a valid Java expression.