MATH CLASS

zyBook 2.16, zyBook 2.17

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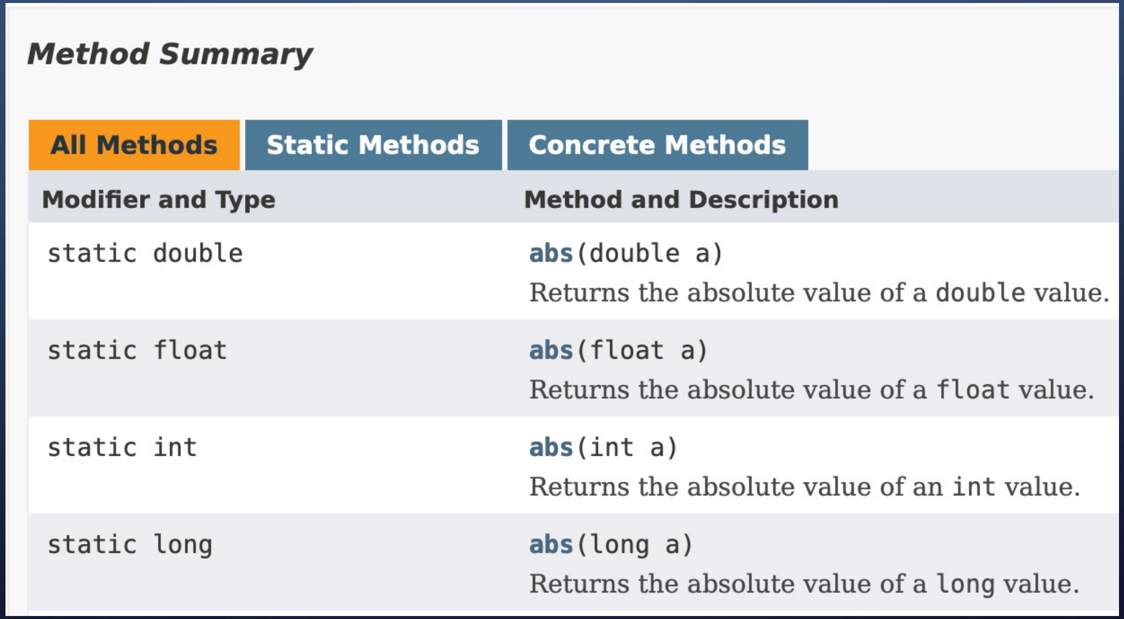
MATH CLASS

- Math class is part of the Java Class Libraries – java.lang (default package)
- Math class has predefined constants and common mathematical functions
- https://docs.oracle.com/javase/8/docs/api/java/lang/Math.html



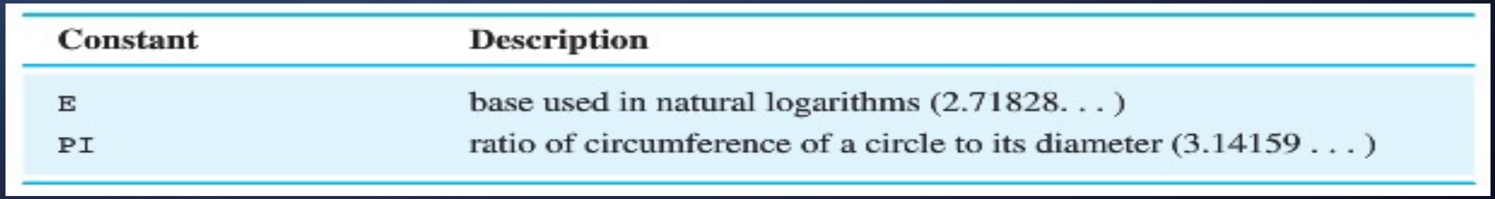
Method Summary

Modifier and Type	Method and Description
`static double`	`abs(double a)` Returns the absolute value of a `double` value.
`static float`	`abs(float a)` Returns the absolute value of a `float` value.
`static int`	`abs(int a)` Returns the absolute value of an `int` value.
`static long`	`abs(long a)` Returns the absolute value of a `long` value.

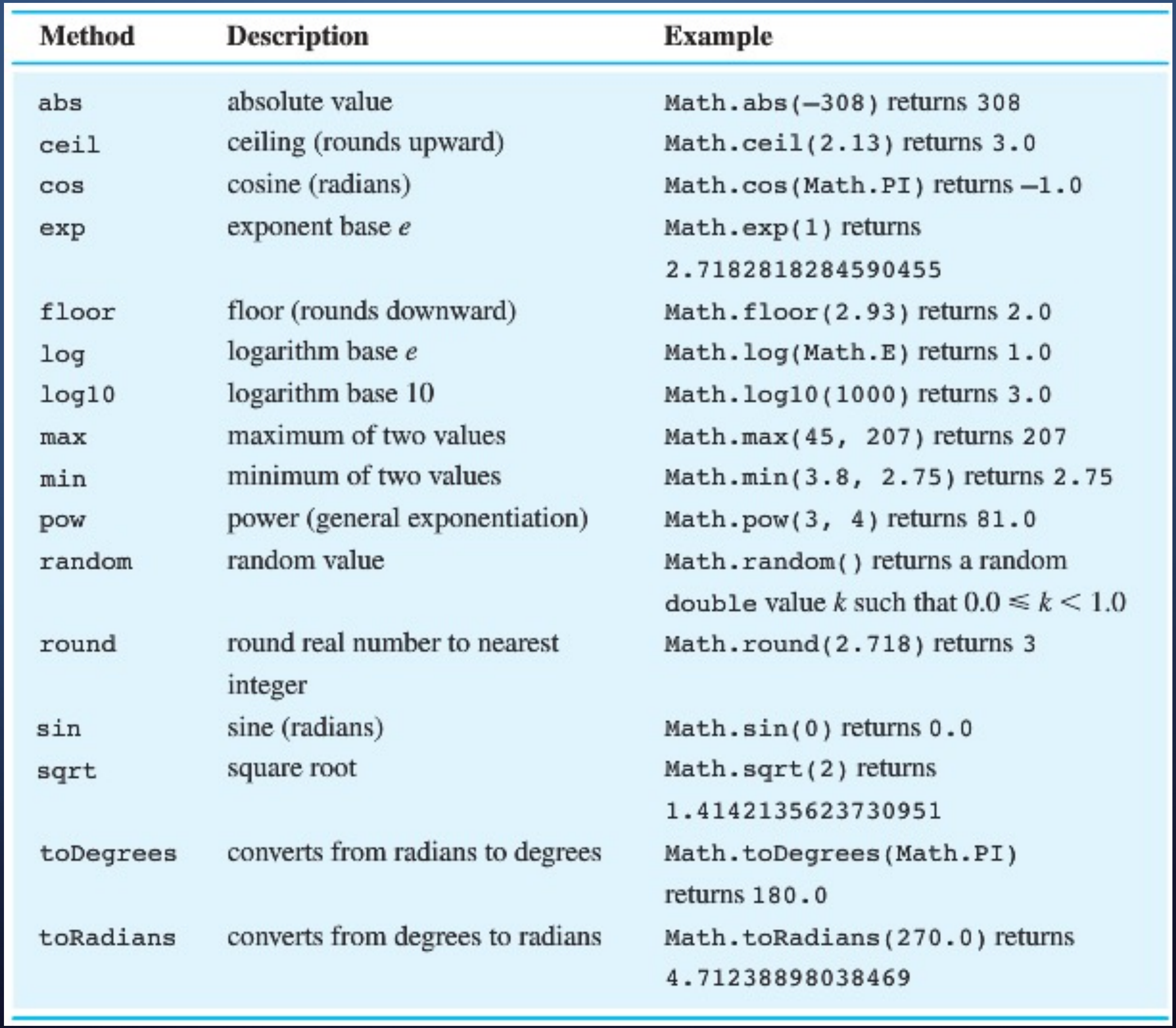
HOW TO USE MATH CLASS

Since the mathematical methods and constants are in another class, we use *dot notation* to call them:

- <class name>.<method>(<parameters>)
  - Math.sqrt(4);
- <class name>.<constant>
  - Math.E
  - Math.PI



Constant	Description
`E`	base used in natural logarithms (2.71828. . .)
`PI`	ratio of circumference of a circle to its diameter (3.14159 . . .)



Method	Description	Example
abs	absolute value	Math.abs(–308) returns 308
ceil	ceiling (rounds upward)	Math.ceil(2.13) returns 3.0
cos	cosine (radians)	Math.cos(Math.PI) returns –1.0
exp	exponent base *e*	Math.exp(1) returns 2.718281828459045
floor	floor (rounds downward)	Math.floor(2.93) returns 2.0
log	logarithm base *e*	Math.log(Math.E) returns 1.0
log10	logarithm base 10	Math.log10(1000) returns 3.0
max	maximum of two values	Math.max(45, 207) returns 207
min	minimum of two values	Math.min(3.8, 2.75) returns 2.75
pow	power (general exponentiation)	Math.pow(3, 4) returns 81.0
random	random value	Math.random() returns a random double value *k* such that $0.0 \leq k < 1.0$
round	round real number to nearest integer	Math.round(2.718) returns 3
sin	sine (radians)	Math.sin(0) returns 0.0
sqrt	square root	Math.sqrt(2) returns 1.4142135623730951
toDegrees	converts from radians to degrees	Math.toDegrees(Math.PI) returns 180.0
toRadians	converts from degrees to radians	Math.toRadians(270.0) returns 4.71238898038469

```java
import java.util.Scanner;

/**
 * This program prompts the user for an integer than prints the square and
 * square root of that int along with PI times that int
 * @author Jessica Young Schmidt
 */
public class InfoAboutNumber {
    /**
     * Starts the program.
     * @param args command line arguments
     */
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);

        System.out.print("Enter an integer: ");
        int val = in.nextInt();

        System.out.println("\nYou entered: " + val);

        System.out.println(val + " squared: " + Math.pow(val, 2));

        System.out.println("Square root of " + val + ": " + Math.sqrt(val));

        System.out.println("PI * " + val + ": " + (Math.PI * val));

        in.close();
    }
}
```

```
$ javac -d bin -cp bin src/InfoAboutNumber.java

$ java -cp bin InfoAboutNumber
Enter an integer: 5

You entered: 5
5 squared: 25.0
Square root of 5: 2.23606797749979
PI * 5: 15.707963267948966
```