The Math Class

A byte size lesson in Java programming.

What is a class?

- Java is an object-oriented language so we cannot create any piece of code in this language that is *not* object-oriented.
- Being object-oriented sort of means combining data and methods into a single unit or file, which we refer to as a class.
- We have been creating classes since the beginning of the year!

```
3   public class QuickRefresher {
4       /**
5        * We are imagining building a game like Mario Kart
6        * where a player might have to collect items during a race.
```

What is the Math Class?

- Java is so popular because it comes with numerous classes that contains functionality programmers can make use of.
- We have seen this with capturing input using the **Scanner** class.
- The **Math** class provides mathematical methods, which may be useful in certain algorithms.

Most common methods

- There are over 40 methods available in the Math class. You are not expected to know them.
- It's useful to know some of the common ones that tend to be used in number based algorithms.

Randomness

- Sometimes we need to generate a random number.
- We do this using the random() method

```
double rand = Math.random();

System.out.println("Your random number is " + rand);
```

- Notice how we don't need to create an instance of the Math class, since it is a **static** class

Min and Max

- Math.min() returns the smaller value among the specified arguments

```
// returns minimum of 25 and 31

System.out.println(Math.min(25, 31));
```

Let's test your understanding!

- What output would the following give?

```
System.out.println(Math.min(3, 25));
```

```
System.out.println(Math.max(45, 66));
```

Square root and Power

- sqrt() returns the square root of the specified number

```
// compute square root of 25

System.out.println(Math.sqrt(25));
```

- pow() returns the square root of the specified number

```
// computes 5 raised to the power 3

System.out.println(Math.pow(5, 3));
```

Let's test your understanding!

- What output would the following give?

```
System.out.println(Math.sqrt(36));
```

```
System.out.println(Math.pow(2, 2));
```

Rounding

- Numeric algorithms often require rounding to an integer
- The round() method rounds a float to an int, and a double to a long

```
// value greater than 5 after decimal
float a = 3.78f;
System.out.println(Math.round(a));  // 4

// value greater than 5 after decimal
double a = 1.878;
System.out.println(Math.round(a));  // 2
```

Let's test your understanding!

- What output would the following give?

```
System.out.println(Math.round(3.24));
```

```
System.out.println(Math.round(4.88));
```

Absolute

- abs() is used to return the absolute value of the input

```
int a = 7;
long b = -23333343;

// print the absolute value
System.out.println(Math.abs(a));  // 7
System.out.println(Math.abs(b));  // 23333343
```

Let's test your understanding!

- What output would the following give?

```
int a = 8.4;
int b = -46.2;

// print the absolute value
System.out.println(Math.abs(a));
System.out.println(Math.abs(b));
```