

I. A) Calling static methods (3.5 pp.98-99)

1a) Open **AP1ch03lab04a.java**

b) Run and write the output:

If the average is 96.4 then the static method round() gives _____

2a) Change **Math.round(96.4)** to **Math.round(average)** and then Run

b) Did you get the same result as #1b)? (yes/no) _____

3a) Change **double average = 96.4;** to **double average = 96.5;**

b) Run and write the output:

If the average is 96.5 then the static method round() gives _____

4a) To create an object of type Math Class insert after **double average = 96.4;**

the line **Math mathObject = new Math();**

b) Run and write what happened _____

5) Answer the following:

a) What is the method in the program **AP1ch03lab04a.java**? _____

b) Write what is in front of the dot operator of the above method. _____

c) Is the item in A)#5b) an object? (yes/no) _____

(Hint: Was there an item instantiated using **new** because objects have to be instantiated?)

d) What is the parameter (variable) used in the method call? _____

B) More methods

1a) Open **AP1ch03lab04b.java** and **AP1ch03lab04bTest.java**

b) Run **AP1ch03lab04bTest.java** and write the output:

grade average: 100.0 final exam: 82.0 final average: _____

c) What is the method used in this file? _____

d) Write what is in front of the dot operator of the above method. _____

e) Is the item in B)#1c) an object? (yes/no) _____

(Hint: Was there an item instantiated using **new** because objects have to be instantiated?)

f) What is the parameter (variable) used in the method call? _____

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Summary 1: Compare the methods **Math.round(average)** and **student1.getGrade(extraCredit)** Math is capitalized because it is a Class while student1 is an object so it is not capitalized. This capitalization is not a rule but good programming practice. When a method is associated with a Class and not an object it is called a *static* method. A static method must have a parameter passed to the method (ex. average). Static methods are ones where there is no object that can be instantiated and cannot use instance variables. In the method header is the reserved word **static** just like in:

public static void main(String[] args). Therefore **main()** is a static method and can not have any objects associated (created) for it. (Note: If **main()** was a regular (non-static) method then to use it we would have to always create an object first.)

C) More methods

1a) Open **AP1ch03lab04b.java**

b) Change the line **public double getGrade(int ec)** to
public static double getGrade(int ec)

c) Open **AP1ch03lab04bTest.java** and Run

d) There are 4 words highlighted (two of them are the same word) in black due to the error in the file **AP1ch03lab04b.java**

i) What are the two instance variables that cannot be used due to **getGrade()** now being a static method?

ii) What is the object that can not be used due to **getGrade()** now being a static method?

Summary 2: Static methods allow you to use a method without creating an object. All the methods found in the Math Class are static methods. Note: All the Math Class methods (see page 95) are static methods. You can make a method static by making the constructor for it have the reserved word **private** as part of the header. (Optional Note: Also a Class can have a descriptor of **abstract** which prevents any object being created for that class.)

Turn in this sheet to be graded!