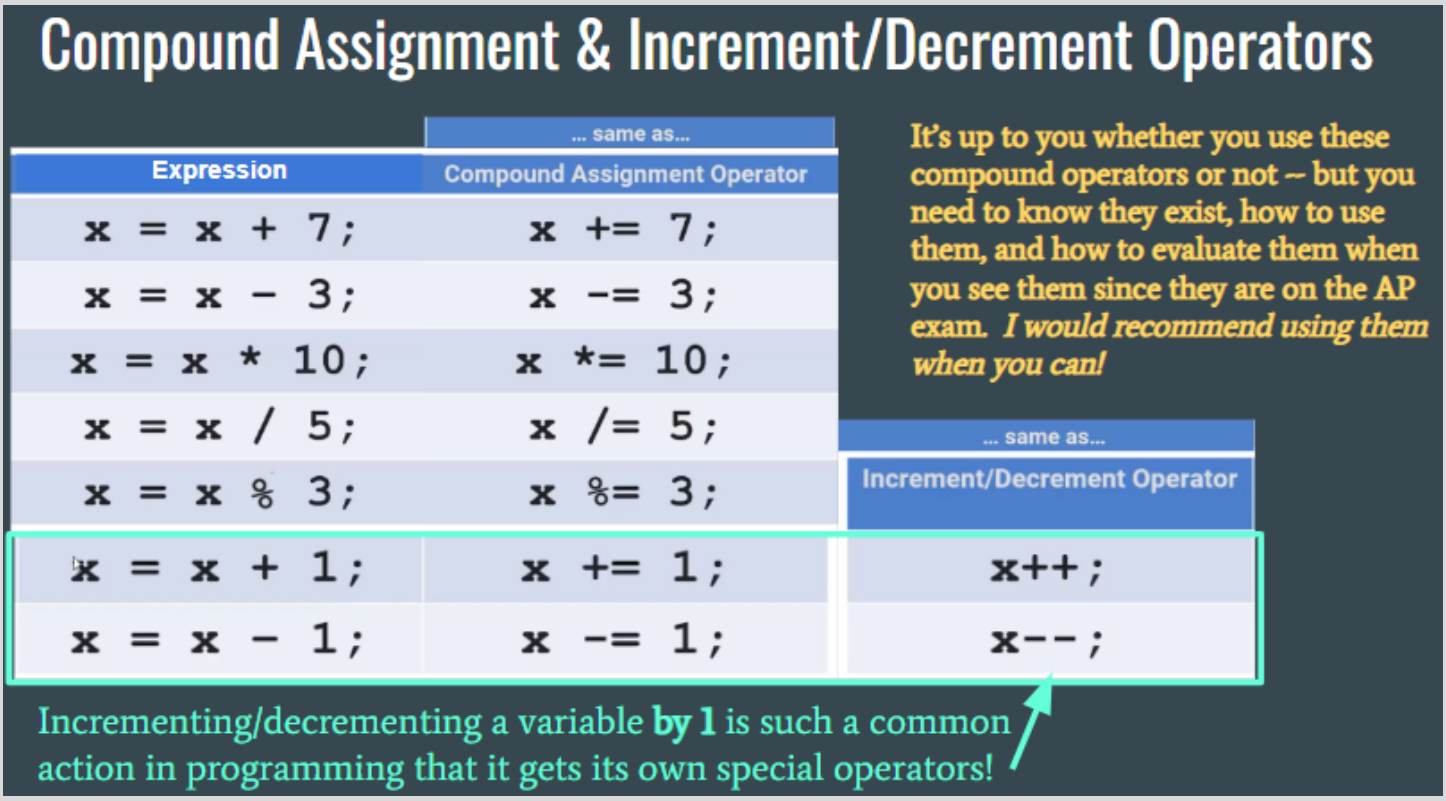
Unit 1: Primitive Types

Topic 4 Lab 2: Compound Assignment Operators

Name:	



Compound Operators

1. **Below is a simple code segment:**

```
int x = 6;                  // line 1
x = x + 4;                  // line 2
System.out.println(x);      // line 3
                            // line 4
int y = 10;                 // line 5
y = y * 5;                  // line 6
System.out.println(y);      // line 7
```

1. REWRITE *Line 2* and *Line 6* using **compound assignment operators**. **2. TEST** that your rewritten code is correct by copying/pasting the code above, **then** replacing it with your rewritten lines. **3.** Copy/paste the **rewritten** code to the right:	

Check your answers!

2. **Below is a simple code segment that changes two different variables by 1:**

```
int x = 15;              // line 1
x = x + 1;               // line 2
System.out.println(x);   // line 3
                         // line 4
int y = 20;              // line 5
y = y - 1;               // line 6
System.out.println(y);   // line 7
```

1. REWRITE *Line 2* using the special **increment operator** (+1) and **REWRITE** *Line 6* using the special **decrement operator** (-1)

2. TEST that your rewritten code is correct by copying/pasting the code above, **then** replacing it with your rewritten lines.

3. Copy/paste the **rewritten** code to the right:

Check your answers!

3. **Mentally determine the printed output:** *Write down the variable's value as it changes!*

Code	**Keep track of variable as it changes:**

```
public class Main
{
    public static void main(String[] args)
    {
        int x = 4;
        x += 7;
        x -= 4;
        x++;
        x *= 11;
        x /= 9 + 1;   // add 9 + 1 before dividing!
        x--;
        x %= 3;
        System.out.println("x = " + x);
    }
}
```

```
STARTED FOR YOU!


x = 4
x =
```

What gets *printed* above?

Afterwards, copy/paste/run the code to check!

Explanation

4. **Mentally determine the printed output:** *Write down the variable's value as it changes!*

Code	**Track variable:**

```java
public class Main
{
    public static void main(String[] args)
    {
       // these operators also work with doubles!
        double y = 5.0;
        y *= 4;
        y--;
        y /= 2;
        y %= 4;
        y++;
        System.out.println("y = " + y);
    }
}
```

STARTED FOR YOU!

```
y = 5.0
y =
```

What gets *printed* above?

Afterwards, copy/paste/run the code to check!

Explanation

5. Complete the **trace table** to help you determine the output when the following code segment executes. *The first few rows are done for you as examples.* Be careful with data types!

```java
int a = 5;
int b = 7;
double c = a;
double d = c;
b += 2;
a++;
b %= a;
c *= 3 + b;
b++;
d = d + a / b;
c = (a + c) % b;
a += a;
```

Complete the trace table:

a	b	c	d
5			
	7		
		5.0	
			5.0
	9		

What's the exact output?

```
System.out.println("a = " + a);
System.out.println("b = " + b);
System.out.println("c = " + c);
System.out.println("d = " + d);
```

```
a =
b =
c =
d =
```

Confirm by copy/pasting the code above into Replit and executing it.

Were you correct? If not, where was your mistake?

Confirm trace table solution & output

Freestyle! Write a program of your choice that involves a user entering textual **and** numerical input in a meaningful way (totally up to you what you ask for). Use `nextLine`, `nextInt`, and/or `nextDouble` as you see fit.

Somewhere in your program, you should **also** include:

- The use of at least one **compound assignment operator**
- The use of at least one i**ncrement/decrement** operator
- The use of at least one `if-else` statement or `if` statement (without the else)

Let the creative juices flow and have fun □

Copy your program's code from Coding Rooms and paste it below:
`(use the Courier New font for code-style!)`

Share your program with your partner and get some feedback!

Let your partner run your freestyle program and check out your code! Give and receive a piece of feedback.

My partner's name:

A piece of feedback my partner gave me:

Done!

Submit in Google Classroom:

Turn in

Now complete the U1T1-U1T4 AP Practice Questions in Google Classroom

(15 Multiple Choice x 4 points each)

You should discuss answers with your partner and classmates before you submit!

Trace Table (back)

```
int a = 5;
int b = 7;
double c = a;
double d = c;
b += 2;
a++;
b %= a;
c *= 3 + b;
b++;
d = d + a / b;
c = (a + c) % b;
a += a; (same as a = a + a)
```

Red = value changed *after* executing that line

a	b	c	d
5			
	7		
		5.0	
			5.0
	9		
6			
	3		
		30.0	
	4		
			6.0
		0.0	
12			

```
System.out.println("a = " + a);
System.out.println("b = " + b);
System.out.println("c = " + c);
System.out.println("d = " + d);
```

Exact printed output:

```
a = 12
b = 4
c = 0.0
d = 6.0
```

Answer (back)

What gets *printed* above?	**x = 1**

```
public class Main
{
    public static void main(String[] args)
    {
        int x = 4;
        x += 7;
        x -= 4;
        x++;
        x *= 11;
        x /= 9 + 1;   // add 9 + 1 before dividing!
        x--;
        x %= 3;
        System.out.println("x = " + x);
    }
}
```

```
x = 4
x = 11
x = 7
x = 8
x = 88
x = 8
x = 7
x = 1
x = 1
```

DETAILS:

```
                //                                          value of variable
                //                                          after line executes
int x = 4;      //                                            -->   x = 4
x += 7;         //  same as: x = x + 7   -->  x = 4 + 7       -->   x = 11
x -= 4;         //  same as: x = x - 4   -->  x = 11 - 4      -->   x = 7
x++;            //  same as: x = x + 1   -->  x = 7 + 1       -->   x = 8
x *= 11;        //  same as: x = x * 11  -->  x = 8 * 11      -->   x = 88
x /= 9 + 1;     //  same as: x = x/(9+1)-->  x = 88 / 10      -->   x = 8 (.8 truncated!)
x--;            //  same as: x = x - 1   -->  x = 8 - 1       -->   x = 7
x %= 3;         //  same as: x = x % 3   -->  x = 7 % 3       -->   x = 1
System.out.println("x = " + x);
```

Answer (back)

What gets *printed* above?	**y = 2.5**

```
public class Main
{
    public static void main(String[] args)
    {
       // these operators also work with doubles!
         double y = 5.0;
         y *= 4;
         y--;
         y /= 2;
         y %= 4;
         y++;
         System.out.println("y = " + y);
    }
}
```

```
STARTED FOR
YOU!


y = 5.0
y = 20.0
y = 19.0
y = 9.5
y = 1.5
y = 2.5
y = 2.5
```

DETAILS:

```
// these operators also work with doubles
double y = 5.0;  //                          -->   y = 5.0
y *= 4;          //  same as: y = y * 4  --> y = 5.0 * 4  -->   y = 20.0
y--;             //  same as: y = y - 1  --> y = 20.0 - 1 -->   y = 19.0
y /= 2;          //  same as: y = y / 2  --> y = 19.0 / 2 -->   y = 9.5
y %= 4;          //  same as: y = y % 4  --> y = 9.5 % 4  -->   y = 1.5 (4 goes into 9.5 twice, remainder 1.5)
y++;             //  same as: y = y + 1  --> y = 1.5 + 1  -->   y = 2.5
System.out.println("y = " + y);
```

Check (back)

```
int x = 6;                // line 1
x += 4;                   // REWRITTEN line 2
System.out.println(x);    // line 3
                          // line 4
int y = 10;               // line 5
y *= 5;                   // REWRITTEN line 6
System.out.println(y);    // line 7
```

Check (back)

```
int x = 15;                // line 1
x++;                       // REWRITTEN line 2
System.out.println(x);     // line 3
                           // line 4
int y = 20;                // line 5
y--;                       // REWRITTEN line 6
System.out.println(y);     // line 7
```