1. What are the values of the following expressions?

a. \[ 4 + 3 \times 8 / 2 - 3 = 4+24/2-3 \]
   \[ = 4+12-3 \]
   \[ =16-3 \]
   \[ =13 \]

b. \[ (4 + 3) \times 8 / 2 - 3 = 7*8/2-3 \]
   \[ = 56/2-3 \]
   \[ = 28-3 \]
   \[ = 25 \]

c. \[ 4 + (3 \times 8) / 2 - 3 = 4+24/2-3 \]
   \[ = 4+12-3 \]
   \[ =16-3 \]
   \[ =13 \]

d. \[ 4 + 3 \times 8 / (2 - 3) = 4+24/(2-3) \]
   \[ = 4+24/(-1) \]
   \[ = 4-24 \]
   \[ = -20 \]

e. \[ (4 + 3) \times 8 / (2 - 3) = 7*8/(2-3) \]
   \[ = 56/(-1) \]
   \[ = -56 \]

f. \[ (4 + 3 \times 8) / 2 - 3 = (4+24)/2-3 \]
   \[ = (28)/2-3 \]
   \[ = 14-3 \]
   \[ = 11 \]

2. What is the value of \( y \) at the end of the following code segment?

```c
int x, y;
x = 34;
y = 10;
if (x >= 20 && (y = 18) == 18) {
y = 17;
}
```

x >= 20 evaluates to true as 10 >= 20
In expression (y=18) 18 is assigned to y
So (y=18) == 18 evaluates to true
True AND True evaluates to True
Hence, test expression (x >=20) && (y=18) == 18 evaluates to true
so y is assigned 17

The value of y at the end of code segment is 17
3. What is the value of y at the end of the following code segment? And What is printed on the console? Why?

```java
int x, y;
x = 34;
y = 10;
if (x >= 20 && (y++ > 10)) {
    System.out.println("Welcome to CSE11!");
}
```

The value of y at the end of the code segment is 11.
Nothing is printed on the console as the test expression given for the if statement evaluates to false.

- x >= 20 evaluates to True because 34 >20
- y++ > 10 evaluates to False because value of y is assigned first and then incremented.
  So 10> 10 evaluates to False.

True AND false evaluates to false, so the print statement is not executed.

4. What are the values of the following expressions if x = 8, y = -5 and z = 2.
(1 point for each correct answer)

a. `x + y != z`
   = 8 -5 != 2
   = 3 != 2
   TRUE

b. `!( 2 * x + 3 * y >= z )`
   = !(16 - 15 >= 2)
   = !(1 >= 2)
   = !(FALSE)
   TRUE

c. `( x - z ) * 2 < z - 2 * y`
   = (8 -2)*2 < 2 - 2 * -5
   = 6*2 < 2 +10
   = 12 < 12
   FALSE

d. `y - z + x >= 0`
   = -5 -2 +8
   = -7 + 8 >= 0
   = 1 >= 0
   TRUE

e. `x - 4 * z + 1 == y`
   = 8 - 4*2 +1 == -5
   = 8 - 8 +1 == -5
   = 1 == -5
   FALSE
5. Assume that $x = 2$, $y = -3$ and $z = 5$. What are the values of $x$, $y$ and $z$ after the following code has been executed?

a. if ( 3 * $x$ + $y$ <= $z$ - 1)  
   $x$ = $y$ + 2 * $z$;  
else  
   $y$ = $z$ - $y$;  
   $z$ = $x$ - 2 * $y$;

Test Expression: $3 \times 2 - 3 \leq 5 - 1$  
   $= 6 - 3 < 4$  
   $= 3 < 4$  
   TRUE  
   $x = y + 2 \times z$  
   $x = -3 + 2 \times (5)$  
   $x = -3 + 10$  
   $= 7$  
   $y = -3$  
   $z = x - 2 \times y$  
   $z = 7 - 2 \times (-3)$  
   (Updated value of $x$ is used)  
   $= 7 + 6 = 13$

Value of $y$ doesn't change because it is in else part of the if statement

b. if ( 3 * $x$ + $y$ <= $z$ - 1) {  
   $x$ = $y$ + 2 * $z$;  
} else {  
   $y$ = $z$ - $y$;  
   $z$ = $x$ - 2 * $y$;  
}

Test Expression: $3 \times 2 - 3 \leq 5 - 1$  
   $= 6 - 3 < 4$  
   $= 3 < 4$  
   TRUE  
   $x = y + 2 \times z$  
   $x = -3 + 2 \times (5)$  
   $x = -3 + 10$  
   $= 7$  
   $y = -3$  
   $z = 5$

Values of $y$ and $z$ doesn't change because they are in the else part of the if statement.
c if ( x > y + z )
    y--;  
    x++;  

Test Expression: 2> -3 +5  
    FALSE

x is incremented  
x= 3  
y= -3  
z= 5

d if ( x > y + z ) {  
    y--;  
    x++;  
}

Test Expression: 2> -3 +5  
    FALSE

y and x are not executed because the test expression is False

x=2  
y= -3  
z= 5