AP Computer Science Principles
Ticket Out the Door
Set 28: Boolean Expressions

Name _____ Period _____

Skill 28.01 Exercise 1

Refer to the following variable declarations, then indicate the output for each `console.log()`

```
var a = 8;
var b = 9;
var c = a;
var d = "hello";
var e = "goodbye";
```

`console.log(a == b);`	
`console.log(a > b);`	
`console.log(a < b);`	
`console.log(d == e);`	
`console.log(d > e);`	

Skill 28.02 Exercise 1

Evaluate whether each of the following is true or false for the conditions below,
`x = 11 and y = 5`

`(( x < 10 ) AND ( y = 6 )`	
`(( x < 10 ) AND ( y = 5 )`	
`(( x > 10 ) AND ( y ≠-3 )`	
`(( x < 10 ) OR ( y = 5 ))`	
`(( x > 10 ) OR ( y = 5 ))`	

Skill 28.02 Exercise 2

Refer to the following variable declarations, then (a) Re-write each statement using proper JavaScript syntax and (b) indicate whether the statement evaluates to *true* or *false*

```
var x = 79;
var y = 46;
var z = -3;
var w = 14.0;
var t = true;
var f = false;
```

Statement	Proper JavaScript syntax	T/F
`(( x < 10 ) AND ( y = 46 )`		
`(( x > 10 ) AND ( y = 46 )`		

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`(( x > 10 ) AND ( z ≠ -3 )`		
`(( x > 10 ) OR ( y = 5 ))`		
`true AND false`		
`true AND !false`		
`!t OR f`		
`x ≠ 3 OR f`		
`y/2 > w AND w ≠ x`		

Skill 28.03 Exercise 1

Refer to the following code to evaluate what is printed.

```
var x = 79, y = 46, z = -3;
var d = 13.89, jj = 40.0;
var b = true, c = false;
```

`console.log( b && c || !c);`	
`console.log( x == y && !(z < 0) || b && c);`	
`console.log( x != y && y==z && b || !c);`	
`console.log( x > y || c || b && jj%4 != 0);`	

Skill 28.04 Exercise 1

Simplify the following

!(A > B || B != A)	
! (A == B || (B >= C || B < A))	

Skill 28.04 Exercise 2

Which of the following Boolean expressions are equivalent to the expression `num ≥ 15`?

Select two answers.

A `(num > 15) AND (num = 15)`

B `(num > 15) OR (num = 15)`

C `NOT (num < 15)`

D `NOT (num < 16)`

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A `NAND` gate is a type of logic gate that produces an output of `false` only when both of its two inputs are `true`. Otherwise, the gate produces an output of `true`. Which of the following Boolean expressions correctly models a `NAND` gate with inputs `P` and `Q` ?

A `(NOT P) AND (NOT Q)`

B `(NOT P) AND Q`

C `NOT (P AND Q)`

D `NOT (P OR Q)`

Skill 28.04 Exercise 3

The table below shows the value of expression base on the values of input1 and input2

Value of `input1`	Value of `input2`	Value of `expression`
`true`	`true`	`false`
`true`	`false`	`true`
`false`	`true`	`true`
`false`	`false`	`true`

Write an expression in terms of input1 and input2 that would produce the output.

Skill 28.05 Exercise 1

In a certain country, a person must be at least 16 years old to drive a car and must be at least 18 years old to vote. The variable age represents the age of a person as an integer.

Write a function that accepts age as a parameter and returns true if the person is old enough to drive but not old enough to vote and returns false otherwise.

Skill 28.05 Exercise 2

A programmer wants to determine whether a score is within 10 points of a given `target`. For example, if the `target` is 50, then the scores 40, 44, 50, 58, and 60 are all within 10 points of the `target`, while 38 and 61 are not.

Write a function that accepts `score and target` as a parameter and returns `true` if and only if the `score` is within 10 points of the `target`?