Chapter 3 Selection Statements

1. <, <=, ==, !=, >, >=

2. `(true) && (3 > 4)`
   false

   `!(x > 0) && (x > 0)`
   false

   `(x > 0) || (x < 0)`
   true

   `(x != 0) || (x == 0)`
   true

   `(x >= 0) || (x < 0)`
   true

   `(x != 1) == !(x == 1)`
   true

3. `(x > 1) && (x < 100)`

4. `((x > 1) && (x < 100)) || (x < 0)`

5. `x > y > 0`
   incorrect

   `x = y && y`
   incorrect

   `x /= y`
   correct

   `x or y`
   incorrect

   `x and y`
   incorrect

6. No. Boolean values cannot be cast to other types.

7. x is 2.

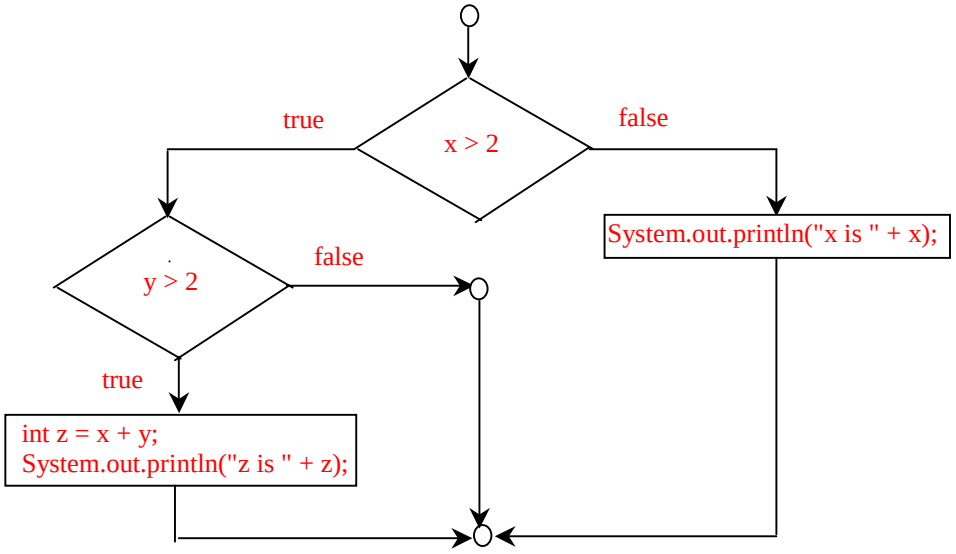
8.

x is 1.

9.

d
d
false
-4

10. Note: else matches the first if clause. No output if `x = 3 and y = 2.` Output is "z is 7" if `if x = 3 and y = 4.` Output is "x is 2" if `if x = 2 and y = 2.`



11. a, c, and d are the same. (B) and (C) are correctly indented.

12. No output if `x = 2 and y = 3.` Output is "x is 3" `if x = 2 and y = 2.` Output is "z is 6".

13. Yes.

14. 0.5, 0.0, 0.234

15. (int)(Math.random() * 20)

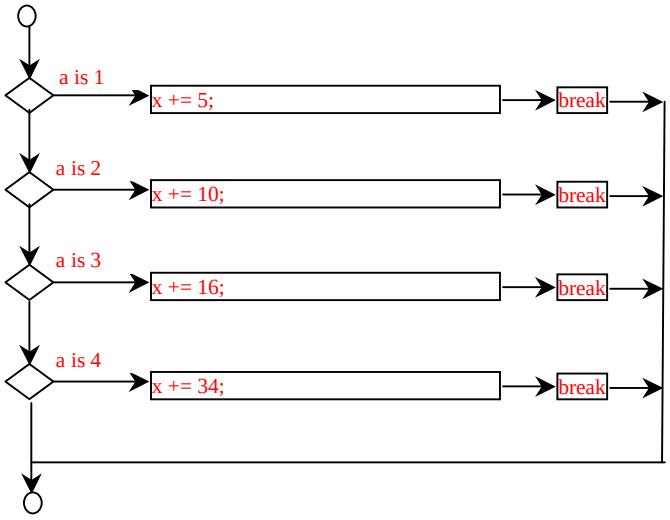
10 + (int)(Math.random() * 10)

10 + (int)(Math.random() * 41)

16. Switch variables must be of `char`, `byte`, `short`, or `int` data types. If a `break` statement is not used, the next `case` statement is performed. You can always convert a `switch` statement to an equivalent `if` statement, but not an `if` statement to a `switch` statement. The use of the `switch` statement can improve readability of the program in some cases. The compiled code for the `switch` statement is also more efficient than its corresponding `if` statement.

17. y is 2.

18.
```
switch (a) {
  case 1: x += 5; break;
  case 2: x += 10; break;
  case 3: x += 16; break;
  case 4: x += 34;
}
```



19. System.out.print((count % 10 == 0) ? count + "\n" : count + " ");

20.

```
The specifiers for outputting a boolean value, a character, a
      decimal integer, a floating-point number, and a string
      are %b, %c, %d, %f, and %s.
```

21.

(a) the last item 3 does not have any specifier.
(b) There is not enough items
(c) The data for %f must a floating-point value

22.

(a) amount is 32.320000 3.233000e+01
(b) amount is 32.3200 3.2330e+01
(c) *false // * denote a space
(d) **Java // * denote a space
(e) false*****Java
(f) *falseJava

23. Use the String.format method to create a formatted string.

24. The precedence order for boolean operators is &, ^, |, &&, and ||
true | true && false is false

true || true && false is true

true | true & false is true.

25.

a. The operands are evaluated first and from left to right. So (--i + i + i++) is –1 – 1 –1. i++ return the value of i, then i is incremented by 1. So, in the next println statement i + ++i is 0 + 1.
b. The operands are evaluated first and from left to right. So, the left i before the + operator is 0 and right i is assigned to 1 by (i = 1). Therefore the println statement prints 1.
c. The operands are evaluated first and from left to right. So, before i in the right of the + operator is evaluated, i is assigned to 1. Therefore, (i = 1) + i evaluates to 2.

26.

```
a = (a = 3) + a;  => a = 3 + 3 = 6

a = a + (a = 3);  => a = 1 + 3 = 4

a += a + (a = 3); => the value of a in the left side of += is obtained (1), a + (a = 3) is 4, therefore, the final result a is 5.

a = 5 + 5 * 2 % a--; => a = 5 + 10 % a-- = 5 + 0 = 5

a = 4 + 1 + 4 * 5 % (++a + 1) => a = 5 + 4 * 5 % (++a + 1) = 5 + 20 % (++a + 1) = 5 + 20 % (2 + 1) = 5 + 20 % 3 = 5 + 2 = 7;

d += 1.5 * 3 + (++d); = > the value of d in the left side of += is obtained (1.0), 1.5 * 3 + (++d) = 4.5 + (++d) = 4.5 + 2.0 = 6.5, therefore, the final result a is 7.5.

d -= 1.5 * 3 + d++; => the value of d in the left side of += is obtained (1.0), 1.5 * 3 + d++ = 4.5 + d++ = 4.5 + 1.0 = 5.5, therefore, the final result is 1.0 – 5.5 = -4.5.
```