Practice test 2

Name

1. Consider the following methods, which appear in the same class.

```
public void slope(int x1, int y1, int x2, int y2)
{
int xChange = x2 - x1;
int yChange = y2 - y1;
printFraction(yChange, xChange);
}

public void printFraction(int numerator, int denominator)
{
System.out.print(numerator + "/" + denominator);
}
```

Assume that the method call slope(1, 2, 5, 10) appears in a method in the same class. What is printed as a result of the method call?

A 8/4

B 5/1

C 4/8

D 2/1

E 1/5

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2. Consider the following method, which is intended to calculate and return the expression $\sqrt{\frac{(x+y)^2}{|a-b|}}$.

```
public double calculate(double x, double y, double a, double b)
{
return /* missing code */;
}
```

Which of the following can replace /* *missing code* */ so that the method works as intended?

(A) Math.sqrt(x ^ 2, y ^ 2, a - b)

(B) Math.sqrt((x + y) ^ 2) / Math.abs(a, b)

(C) Math.sqrt((x + y) ^ 2 / Math.abs(a - b))

Math.sqrt(Math.pow(x + y, 2) / Math.abs(a, b))

(E) Math.sqrt(Math.pow(x + y, 2) / Math.abs(a - b))

---

3. Consider the following method.

```
public double myMethod(int a, boolean b)
{  /* implementation not shown */  }
```

Which of the following lines of code, if located in a method in the same class as myMethod, will compile without error?

(A) int result = myMethod(2, false);

(B) int result = myMethod(2.5, true);

(C) double result = myMethod(0, false);

(D) double result = myMethod(true, 10);

(E) double result = myMethod(2.5, true);

---

4. Consider the following code segment.

```
double num = 9 / 4;
System.out.print(num);
System.out.print(" ");
System.out.print((int) num);
```

What is printed as a result of executing the code segment?

(A) 2 2

(B) 2.0 2

(C) 2.0 2.0

(D) 2.25 2

(E) 2.25 2.0

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5. Consider the following code segment.

```
double x = (int) (5.5 - 2.5);
double y = (int) 5.5 - 2.5;
System.out.println(x - y);
```

What is printed as a result of executing the code segment?

(A) -1.0

(B) -0.5

(C) 0.0

0.5

(E) 1.0

6. Consider the following code segment.

```
int w = 1;
int x = w / 2;
double y = 3;
int z = (int) (x + y);
```

Which of the following best describes the results of compiling the code segment?

A The code segment compiles without error.

B The code segment does not compile, because the int variable x cannot be assigned the result of the operation w / 2.

C The code segment does not compile, because the integer value 3 cannot be assigned to the double variable y.

The code segment does not compile, because the operands of the addition operator cannot be of different types int and double.

E The code segment does not compile because the result of the addition operation is of type double and cannot be cast to an int.

---

7. Consider the following code segment.

```
double x = 4.5;
int y = (int) x * 2;
System.out.print(y);
```

What is printed as a result of executing the code segment?

8

B 8.0

C 9

D 9.0

E 10

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8. The code segment below is intended to calculate the circumference c of a circle with the diameter d of 1.5. The circumference of a circle is equal to its diameter times pi.

```
/* missing declarations */
c = pi * d;
```

Which of the following variable declarations are most appropriate to replace /* *missing declarations* */ in this code segment?

(A)
```
int pi = 3.14159;
int d = 1.5;
final int c;
```

(B)
```
final int pi = 3.14159;
int d = 1.5;
int c;
```

(C)
```
final double pi = 3.14159;
double d = 1.5;
double c;
```

(D)
```
double pi = 3.14159;
double d = 1.5;
final double c = 0.0;
```

(E)
```
final double pi = 3.14159;
final double d = 1.5;
final double c = 0.0;
```

9. Consider the following code segment.

```
String temp = "comp";
System.out.print(temp.substring(0) + " " +
temp.substring(1) + " " +
temp.substring(2) + " " +
temp.substring(3));
```

What is printed when the code segment is executed?

(A) comp

(B) c o m p

(C) comp com co c

(D) comp omp mp p

(E) comp comp comp comp

10. Consider the following code segment.

```
int a = 5;
int b = 4;
int c = 2;
a *= 3;
b += a;
b /= c;
System.out.print(b);
```

What is printed when the code segment is executed?

(A) 2

(B) 4

(C) 9

(D) 9.5

(E) 19

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11. Consider the following code segment.

```
String str = "CompSci";
System.out.println(str.substring(0, 3));
int num = str.length();
```

What is the value of num when the code segment is executed?

(A) 3

(B) 4

(C) 5

(D) 6

(E) 7

12. Consider the following code segment.

```
String str = "0";
str += str + 0 + 8;
System.out.println(str);
```

What is printed as a result of executing the code segment?

(A) 8

(B) 08

(C) 008

(D) 0008

(E) Nothing is printed, because numerical values cannot be added to a String object.

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13. Consider the following code segment.

```
int one = 1;
int two = 2;
String zee = "Z";
System.out.println(one + two + zee);
```

What is printed as a result of executing the code segment?

(A) 12Z

(B) 3Z

(C) 12zee

(D) 3zee

(E) onetwozee

Directions: Select the choice that best fits each statement. The following question(s) refer to the following incomplete class declaration.

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```
public class TimeRecord
{
  private int hours;
  private int minutes; // 0 ≤ minutes < 60
  /** Constructs a TimeRecord object.
   *  @param h the number of hours
   *           Precondition: h ≥ 0
   *  @param m the number of minutes
   *           Precondition: 0 ≤ m < 60
   */
  public TimeRecord(int h, int m)
  {
    hours = h;
    minutes = m;
  }

  /** @return the number of hours
   */
  public int getHours()
  { /* implementation not shown */ }

  /** @return the number of minutes
   *  Postcondition: 0 ≤ minutes < 60
   */
  public int getMinutes()
  { /* implementation not shown */ }

  /** Adds h hours and m minutes to this TimeRecord.
   *  @param h the number of hours
   *           Precondition: h ≥ 0
   *  @param m the number of minutes
   *           Precondition: m ≥ 0
   */
  public void advance(int h, int m)
  {
    hours = hours + h;
    minutes = minutes + m;
    /* missing code */
  }
  // Other methods not shown
```

14. Consider the following declaration that appears in a class other than TimeRecord.
TimeRecord [ ] timeCards = new TimeRecord [100] ;

Assume that timeCards has been initialized with TimeRecord objects. Consider the following code segment that is intended to compute the total of all the times stored in timeCards.

```
TimeRecord total = new TimeRecord(0,0);
for (int k = 0; k < timeCards.length; k++)
{
  /* missing expression */ ;
}
```

Which of the following can be used to replace / * *missing expression* * / so that the code segment will work as intended?

(A) timeCards [k] .advance ( )

(B) total += timeCards [k] .advance ( )

(C)
```
total.advance(timeCards[k].hours,
              timeCards[k].minutes)
```

(D)
```
total.advance(timeCards[k].getHours(),
              timeCards[k].getMinutes())
```

(E)
```
timeCards[k].advance(timeCards[k].getHours(),
                     timeCards[k].getMinutes())
```

15. Consider the following method.

```
public int getTheResult(int n)
{
int product = 1;
for (int number = 1; number < n; number++)
{
if (number % 2 == 0)
product *= number;
}
return product;
}
```

What value is returned as a result of the call getTheResult(8) ?

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(A) 48

(B) 105

(C) 384

(D) 5040

(E) 40320

16. Consider the following method.

```
public int mystery(int num)
{
int x = num;
while (x > 0)
{
if (x / 10 % 2 == 0)
return x;
x = x / 10;
}
return x;
}
```

What value is returned as a result of the call mystery(1034) ?

(A) 4

(B) 10

(C) 34

(D) 103

(E) 1034

17. Consider the following method.

```
public int pick(boolean test, int x, int y)
{
if (test)
return x;
else
return y;
}
```

What value is returned by the following method call?

```
pick(false, pick(true, 0, 1), pick(true, 6, 7))
```

(A) 0

(B) 1

(C) 3

(D) 6

(E) 7

18. Consider the following code segment.

```
int x = 5;
int y = 6;
/* missing code */
z = (x + y) / 2;
```

Which of the following can be used to replace /* *missing code* */ so that the code segment will compile?

1. `int z = 0;`
2. `int z;`
3. `boolean z = false;`

(A) I only

(B) II only

(C) I and II only

(D) II and III only

(E) I, II, and III

---

19. A code segment (not shown) is intended to determine the number of players whose average score in a game exceeds `0.5`. A player's average score is stored in `avgScore`, and the number of players who meet the criterion is stored in the variable `count`.

Which of the following pairs of declarations is most appropriate for the code segment described?

(A) double avgScore;
boolean count;

(B) double avgScore;
double count;

(C) double avgScore;
int count;

(D) int avgScore;
boolean count;

(E) int avgScore;
int count;

20. The Student class has been defined to store and manipulate grades for an individual student. The following methods have been defined for the class.

```
/* Returns the sum of all of the student's grades */
public double sumOfGrades()
{  /* implementation not shown */  }
/* Returns the total number of grades the student has received */
public int numberOfGrades()
{  /* implementation not shown */  }
/* Returns the lowest grade the student has received */
public double lowestGrade()
{  /* implementation not shown */  }
```

Which of the following statements, if located in a method in the Student class, will determine the average of all of the student's grades except for the lowest grade and store the result in the double variable newAverage ?

(A) newAverage = sumOfGrades() / numberOfGrades() - 1;

(B) newAverage = sumOfGrades() / (numberOfGrades() - 1);

(C) newAverage = sumOfGrades() - lowestGrade() / (numberOfGrades() - 1);

(D) newAverage = (sumOfGrades() - lowestGrade()) / numberOfGrades() - 1;

(E) newAverage = (sumOfGrades() - lowestGrade()) / (numberOfGrades() - 1);

21. Consider the following method.

```
public void doSomething()
{
System.out.println("Something has been done");
}
```

Each of the following statements appears in a method in the same class as doSomething. Which of the following statements are valid uses of the method doSomething ?

1. doSomething();
2. String output = doSomething();
3. System.out.println(doSomething());

(A) I only

(B) II only

(C) I and II only

(D) I and III only

(E) I, II, and III

22. Consider the following code segment.

```
double d1 = 10.0;
Double d2 = 20.0;
Double d3 = new Double(30.0);
double d4 = new Double(40.0);

System.out.println(d1 + d2 + d3.doubleValue() + d4);
```

What, if anything, is printed when the code segment is executed?

(A) 100.0

(B) 10.050.040.0

(C) 10.020.070.0

(D) 10.020.030.040.0

(E) There is no output due to a compilation error.

23. Consider the following class definition.

```
public class ExamScore
{
private String studentId;
private double score;
public ExamScore(String sid, double s)
{
studentId = sid;
score = s;
}
public double getScore()
{
return score;
}
public void bonus(int b)
{
score += score * b/100.0;
}
}
```

Assume that the following code segment appears in a class other than ExamScore.

```
ExamScore es = new ExamScore("12345", 80.0);
es.bonus(5);
System.out.println(es.getScore());
```

What is printed as a result of executing the code segment?

(A) 4.0

(B) 5.0

(C) 80.0

(D) 84.0

(E) 85.0

24. Assume that the boolean variables a and b have been declared and initialized. Consider the following expression.

(a && (b || !a)) == a && b

Which of the following best describes the conditions under which the expression will evaluate to true?

(A) Only when a is true

(B) Only when b is true

(C) Only when both a and b are true

(D) The expression will never evaluate to true.

(E) The expression will always evaluate to true.

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25. Assume that the boolean variables a, b, c, and d have been declared and initialized. Consider the following expression.

!(!(a && b) || (c || !d))

Which of the following is equivalent to the expression?

(A) (a && b) && (!c && d)

(B) (a || b) && (!c && d)

(C) (a && b) || (c || !d)

(D) (!a || !b) && (!c && d)

(E) !(a && b) && (c || !d)

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26. At a certain high school students receive letter grades based on the following scale.

Integer Score	Letter Grade
93 or above	A
From 84 to 92 inclusive	B
From 75 to 83 inclusive	C
Below 75	F

Which of the following code segments will assign the correct string to grade for a given integer score ?

I.
```
if (score >= 93)
  grade = "A";
if (score >= 84 && score <= 92)
  grade = "B";
if (score >= 75 && score <= 83)
  grade = "C";
if (score < 75)
  grade = "F";
```

II.
```
if (score >= 93)
  grade = "A";
if (84 <= score <= 92)
  grade = "B";
if (75 <= score <= 83)
  grade = "C";
if (score < 75)
  grade = "F";
```

III.
```
if (score >= 93)
  grade = "A";
else if (score >= 84)
  grade = "B";
else if (score >= 75)
  grade = "C";
else
  grade = "F";
```

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(A) II only

(B) III only

(C) I and II only

(D) I and III only

(E) I, II, and III

27. Consider the following code segment, which is intended to simulate a random process. The code is intended to set the value of the variable event to exactly one of the values 1, 2, or 3, depending on the probability of an event occurring. The value of event should be set to 1 if the probability is 70 percent or less. The value of event should be set to 2 if the probability is greater than 70 percent but no more than 80 percent. The value of event should be set to 3 if the probability is greater than 80 percent. The variable randomNumber is used to simulate the probability of the event occurring.

```
int event = 0;
if (randomNumber <= 0.70)
{
event = 1;
}
if (randomNumber <= 0.80)
{
event = 2;
}
else
{
event = 3;
}
```

The code does not work as intended. Assume that the variable randomNumber has been properly declared and initialized. Which of the following initializations for randomNumber will demonstrate that the code segment will not work as intended?

(A) randomNumber = 0.70;

(B) randomNumber = 0.80;

(C) randomNumber = 0.85;

(D) randomNumber = 0.90;

(E) randomNumber = 1.00;

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28. Consider the following code segment.

```
int j = 1;
while (j < 5)
{
int k = 1;
while (k < 5)
{
System.out.println(k);
k++;
}
j++;
}
```

Which of the following best explains the effect, if any, of changing the first line of code to `int j = 0;` ?

(A) There will be one more value printed because the outer loop will iterate one additional time.

(B) There will be four more values printed because the outer loop will iterate one additional time.

(C) There will be one less value printed because the outer loop will iterate one fewer time.

(D) There will be four fewer values printed because the outer loop will iterate one fewer time.

(E) There will be no change to the output of the code segment.

29. Consider the following two code segments where the int variable choice has been properly declared and initialized.

Code Segment A

```
if (choice > 10)
{
System.out.println("blue");
}
else if (choice < 5)
{
System.out.println("red");
}
else
{
System.out.println("yellow");
}
```

Code Segment B

```
if (choice > 10)
{
System.out.println("blue");
}
if (choice < 5)
{
System.out.println("red");
}
else
{
System.out.println("yellow");
}
```

Assume that both code segments initialize choice **to the same integer value. Which of the following best describes the conditions on the initial value of the variable** choice **that will cause the two code segments to produce different output?**

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(A) choice < 5

(B) choice >= 5 and choice <= 10

(C) choice > 10

(D) choice == 5 or choice == 10

(E) There is no value for choice that will cause the two code segments to produce different output.

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30. Consider the following code segments, which are each intended to convert grades from a 100-point scale to a 4.0-point scale and print the result. A grade of 90 or above should yield a 4.0, a grade of 80 to 89 should yield a 3.0, a grade of 70 to 79 should yield a 2.0, and any grade lower than 70 should yield a 0.0.
Assume that grade is an int variable that has been properly declared and initialized.

Code Segment I

```
double points = 0.0;
if (grade > 89)
{
points += 4.0;
}
else if (grade > 79)
{
points += 3.0;
}
else if (grade > 69)
{
points += 2.0;
}
else
{
points += 0.0;
}
System.out.println(points);
```

Code Segment II

```
double points = 0.0;
if (grade > 89)
{
points += 4.0;
}
if (grade > 79)
{
grade += 3.0;
}
if (grade > 69)
{
points += 2.0;
}
if (grade < 70)
{
points += 0.0;
}
System.out.println(points);
```

Which of the following statements correctly compares the values printed by the two methods?

(A) The two code segments print the same value only when grade is below 80.

(B) The two code segments print the same value only when grade is 90 or above or grade is below 80.

(C) The two code segments print the same value only when grade is 90 or above.

(D) Both code segments print the same value for all possible values of grade.

(E) The two code segments print different values for all possible values of grade.

31. Consider the following methods, which appear in the same class.

```
public int function1(int i, int j)
{
return i + j;
}

public int function2(int i, int j)
{
return j - i;
}
```

Which of the following statements, if located in a method in the same class, will initialize the variable x to 11?

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(A) int x = function2(4, 5) + function1(1, 3);

(B) int x = function1(4, 5) + function2(1, 3);

(C) int x = function1(4, 5) + function2(3, 1);

(D) int x = function1(3, 1) + function2(4, 5);

(E) int x = function2(3, 1) + function1(4, 5);

32. Consider the following class declaration.

```
public class GameClass
{
private int numPlayers;
private boolean gameOver;

public Game()
{
numPlayers = 1;
gameOver = false;
}

public void addPlayer()
{
numPlayers++;
}

public void endGame()
{
gameOver = true;
}
}
```

Assume that the GameClass object game has been properly declared and initialized in a method in a class other than GameClass. Which of the following statements are valid?

1. game.numPlayers++;
2. game.addPlayer();
3. game.gameOver();
4. game.endGame();

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(A) IV only

(B) I and III only

(C) I and IV only

(D) II and IV only

(E) II, III, and IV only