1. Find the values of the following expressions. *Observe operator precedences and watch out for integer division.*

   (a) \(9 / 2 / 5 = \) __________
   
   (b) \(7 \% 5 \% 3 = \) __________
   
   (c) \(12 / 2 * 3 = \) __________
   
   (d) \((12 + 3) / 2) / (8 - 5 + 1) = \) __________
   
   (e) \(10 + 20 * 3 /10 * (-4) = \) __________

2. Suppose that \(P\), \(Q\), and \(R\) represent conditions such that \(P = false\), \(Q = true\) and \(R = true\). Are the following true or false?

   (a) \(Q \&\& P \&\& R\)
   
   (b) \(Q \&\& P || R\)
   
   (c) \((P || Q \&\& R) \&\& (3 <= 4)\)
   
   (d) \(R || (P || !Q || !R \&\& (4 > 3))\)

3. Write a *complete* Java program that will prompt the user for a positive integer \(n\). Then the program will print out all the values of \(i^2\) for \(i\) between 1 and \(n\) inclusive. A sample dialog follows.

   ```
   Input a positive integer: 5
   1
   4
   9
   16
   25
   ```

4. Consider the following block of unindented code.

   ```java
   if (i >= k) {
     if (a < b) if (c > d) x = 1; else x = 2; else if (a > e) x = 3; }
   else x = 5;
   ```

   Rewrite this code using *indenting* so that it is obvious which `else` goes with which `if`. 

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**Instructions.** There are no special instructions for these practice test problems.
5. Use a switch statement to rewrite the following code fragment.

```java
if (i == 1)
    p = i;
else if (i >= 2 && i <= 4)
    p = i + 1;
else if (i == 5)
    p = i - 3;
else
    p = 0;
```

6. Rewrite the following fragment using while and do-while loops.

```java
int cnt;
for (cnt = 1; cnt < 20; cnt++)
    System.out.println(cnt);
```

7. Is the code segment on the left side equivalent to the one on the right side? If not, give values for the variables that make the two fragments nonequivalent.

(a)

```java
if (a < b)
    if (c < d)
        System.out.println("one");
    else
        System.out.println("two");
else
    System.out.println("two");
```

(b)

```java
if (a > b)
    if (c < d)
        System.out.println("one");
    else
        System.out.println("two");
else
    System.out.println("two");
```

(c)

```java
if (a > b)
    System.out.println("one");
else
    System.out.println("two");
```

```java
if (a > b)
    n = 1;
else
    n = 0;
switch (n) {
    case 1:
        System.out.println("one");
        break;
    case 0:
        System.out.println("two");
}
```
8. Write Java code that reads in two parameters c and n. The parameter c is of type char, and n is of type int. The code prints a single line of n copies of the character c. For example, if n = 5 and c = &amp;, the code would print `&&&&&`. Use a for loop.

9. Fill in the blank so that each loop prints exactly 12 asterisks.

(a) 
```java
for (int i = _____; i <= 12; i++)
    System.out.println("*");
```

(b) 
```java
int i = 5;
while (i > _____) {
    System.out.println("*");
    i--;
}
```

(c) 
```java
int i = _____;
do {
    System.out.println("*");
    i = i + 2;
} while (i < 30);
```

10. Does the following code segments terminate or are they infinite?

(a) 
```java
n = 10;
for (i = 10; i <= n; i--)
    i = i + 1;
```

(b) 
```java
i = 101;
j = 31;
while (j < i) {
    i--;
    j++;
}
```

(c) 
```java
n = 11;
for (i = 1; i <= n; i++) {
    j = 1;
    while (i + j > n)
        System.out.println("?");
}
```

11. Suppose i and j are integer variables. Determine what is printed by the following loops. If the loop does not terminate, write ‘INFINITE LOOP’.

```java
```
(a)

```
int j = 1;
for (int i = 1; i <= 6; i++)
    j *= i;
System.out.println(j);
```

(b)

```
for (int i = 1; i <= 4; i++) {
    System.out.println(i);
    i--;
}
```

(c)

```
int n = 8;
for (int i = 1; i <= n; i++) {
    for (int j = 1; j <= i; j++)
        System.out.print(i);
    System.out.println();
}
```

12. How many times is the `println` statement in the following code fragment executed?

```
for (i = 1; i <= 5; i++)
    for (j = 2; j <= 6; j++)
        for (k = 3; k <= 7; k++)
            System.out.println(i + j + k);
```