Recursion - The idea of a method running itself inside of itself.

1. write out all calls to the recursive method
2. substitute values

Examples

12-8-2: Given the following method declaration, what value is returned as the result of the call `mystery(5)` ?

```
1  public static int mystery(int n)
2  {
3     if (n == 0)
4        return 1;
5     else
6        return 3 * mystery (n - 1);
7  }
```

- A. 243
- B. 0
- C. 3
- D. 81
- E. 27

Check Me | Compare me

mystery(5) = 3 * mystery(4) = 243
mystery(4) = 3 * mystery(3) = 81
mystery(3) = 3 * mystery(2) = 27
mystery(2) = 3 * mystery(1) = 9
mystery(1) = 3 * mystery(0) = 3
mystery(0) = 1

12-8-3: Given the following method declaration, what value is returned as the result of the call `product(5)` ?

```
1  public static int product(int n)
2  {
3     if (n <= 1)
4        return 1;
5     else
6        return n * product(n - 2);
7  }
```

- A. 1
- B. 10
- C. 25
- D. 3125
- E. 15

Check Me | Compare me

product(5) = 5 * product(3) = 15
product(3) = 3 * product(1) = 3
product(1) = 1

12-8-4: Given the following method declaration, what value is returned as the result of the call `f(5)` ?

```
1  public static int f(int n)
2  {
3     if (n == 0)
4        return 0;
5     else if (n == 1)
6        return 1;
7     else return f(n-1) + f(n-2);
8  }
```

- A. 8
- B. 3
- C. There is no result because of infinite recursion.
- D. 5
- E. 0

Check Me | Compare me

$f(5) = f(4) + f(3) = 5$

$f(4) = 2f(3) + 1f(2) = 3$

$f(3) = 1f(2) + 1f(1) = 2$

$f(2) = 1f(1) + 0f(0) = 1$

$f(1) = 1$

$f(0) = 0$