Have a good break!!!

Question 0. (answer omitted)

Question 1. (a)

```
| f | 1 |
| i | 1 |
| k |   |
```

(b) Variable i and k are created when the frame for the call `Numbers.f(1)` is created. Variable `s` is created when the frame for the call `p(i+1)` is created.

Question 2.
/** = number of female ancestors of r (= 0 if r is null) */
```
public static int fa(Rhino r) {
    if (r == null) return 0;
    return fa(r.father) + (r.mother == null ? 0 : 1 + fa(r.mother));
}
/** = n^p. p can be any integer. */
```
```
public static double pow(double n, int p) {
    if (p == 0) return 1;
    if (p < 0) return 1 / pow(n, -p);
    return n * pow(n, p-1);
}
```

Question 3(a).
```
// Store in x the length of the longest String in v.
int x = v.get(0).length();
// invariant: 1 <= k && x = length of longest string in v[0..k-1]
for (int k= 1; k < v.size(); k= k+1) {
    if (v.get(k).length() > x) {
        x = v.get(k).length();
    }
} // x = length of longest string in v
```

Question 4.
(a) 1: 5. 2: 11. 3: 10. 4: true. 5: false. 6: true. 7: true. 8: 4.
(b) 1: One, One. 2: One, Two.

Question 5. (a) A parameter is a variable that is declared within the parentheses of a method header. An argument is an expression that appears within the parentheses of a method call.

(b) /** Constructor: An instance with temperature 0 on day d */
```
public C(Day d) {
    this(0, d);
}
```

(c) Write the cast as (Cat) v. This will not produce an error if the real class of v is Cat or a subclass of Cat.