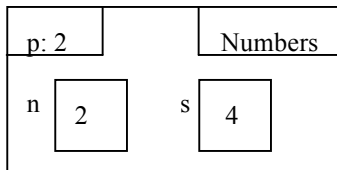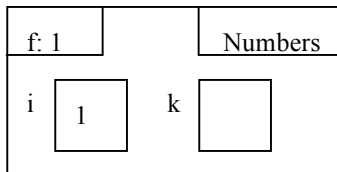*Have a good break!!!*

Question 0. (answer omitted)

Question 1. (a)

 (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.