Building Functions Worksheet 2 - Answers

1. If a ball rolls down a hill and goes 8 feet in the first second, 16 feet in the next and 32 feet in the third, how far will it fall after 6 seconds?
   256 feet

2. Write an explicit and a recursive function that describes the sequence 1, 3, 5, 7, 9...
   $f(n + 1) = f(n) + 2$ with $f(1) = 1$.

3. Find the twenty-third term of the arithmetic sequence 1, 5, 9....
   89.

4. If the first term of a sequence is 2 and the third and fourth terms are 8 and 16, what is the second term?
   4.

5. Your allowance increases by \$2 every year and you start at \$20 per month. Write your allowance as a function of years.
   $A(n) = 18 + 2n$.

6. If the explicit function that describes your cable bill is $c(y) = 50 \times 1.02^{y-1}$ after y years, what would be an equivalent recursive function?
   $c(y) = c(y - 1) \times 1.02$ and $c(1) = 50$.

7. If a bird population was 5 million in one year and the projected population, based on a geometric sequence, after 25 years was 6.7 million, what would the annual growth rate be?
   1.2%.

8. What is the explicit function of the sequence given by the function $f(n) = f(n - 1) + 3$ if $f(1) = 0$?
   $f(n) = 3n - 3$.

9. Write the recursive function $f(n) = (f(n-1))^2$ with $f(1) = 2$ as an explicit function.
   $f(n) = 2^{2^{n-1}}$.

10. Find both the explicit and recursive formulas of the geometric sequence 2, 2.5, 3.125...
    $f(n) = 2 \times 1.25^{n-1}$ and $f(n) = 1.25f(n - 1)$ where $f(1) = 2$.