Homework 11

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1) I would try the lower bound which is 4^3 = 64, and the higher bound which is 5^3 = 125. Since 82 is in between 125 and 64, the floor of cube root(82) would be 4 since 4 is the lower bound
2) Yes, you can. If we root the inequality by r, then the inequality will be root <= (n)^1/r < root+1. Because of this, the lower bound is root. Since the floor function returns the lower bound of the inequality, we can conclude the root = floor((n)^1/r).
3) Yes, if r is an even number, then g^r (which is n) can be a positive number, while g can be negative. If r is negative, then g cannot be a negative number since n will become n, which violates the preconditions. There is no reason to try a guess that is greater than n because r can only be a positive integer, so root of n by r will always be less than n.
4) lowEnough could be -root and tooHigh could be root+1. Since there is a chance that r could be an even number and the root of n can be a negative, the lower bound has to be the negative of the the root. The high bound has to be the root+1 since the both the positive and negative roots will be less than root+1.
5) I would first set the bounds at 0 and 47226 and guess 23613. Then if 23613 is less than the expression, which it is, I would set the bounds at 0 and 23613. I would do that again, but with the guess 11806. Set the bounds at 0 and 11806, and do that until 8 is the halfway point between the bounds.

6)

```
private static int root(int n, int r) {
    int lowerBound = 0;
    int higherBound = n;
    int guess = (lowerBound + higherBound) / 2;
    while (guess!=power(n,r))
        if (guess < power(n,r)) {
            lowerBound = guess;
        }
        else {
            higherBound = guess;
        }
        guess = (lowerBound + higherBound) / 2;
}
```