

458. Poor Pigs

One round, n pigs

Obviously, $\sum(buckets) = 2^n$

R rounds, n pigs

$$\sum(buckets) = (r + 1)^n$$

Prove(mathematical induction): If it's true for r rounds,
for $r + 1$ rounds situation, after 1st round, we'll have:

x pigs remain	buckets can be checked by n rounds	num of situations
n	$(r + 1)^n$	$\binom{n}{n}$
$n - 1$	$(r + 1)^{n-1}$	$\binom{n}{n-1}$
$n - 2$	$(r + 1)^{n-2}$	$\binom{n}{n-2}$
...		
0	$(r + 1)^0$	$\binom{n}{0}$

$$\sum_{i=0}^n (r^i \times \binom{n}{i}) = (r + 1 + 1)^n$$

```
public class Solution {
    public int poorPigs(int buckets, int minutesToDie, int minutesToTest) {
        if(buckets < 2){
            return 0;
        }
        int r = minutesToTest / minutesToDie;
        if(r == 0){
            return -1;
        }
        int i = 1;
        long tmp = r + 1;
        while(tmp < buckets){
            i++;
            tmp = tmp * (r + 1);
        }
        return i;
    }
}
```

