

## Problem 12 – Solution

1. Let's call the original height the ball was dropped from  $h$ .  
After the first bounce we know it reached 75% of this height, so we can write this as  $0.75h$ .

After the next bounce it reached a height of:

$$0.75 \times 0.75h = 0.5625h$$

2. The question is asking to find the number of bounces it took for the height of the ball to be less than 20% of the original height. In other words less than  $0.2h$ .
3. After 3 bounces, the ball reached  $0.75 \times 0.5625h = 0.4219h$ . This is only 42.19% of the original height, so it is not small enough yet.
4. After 4 bounces, the ball reached  $0.75 \times 0.4219h = 0.3164h$ . This is still not small enough.
5. After 5 bounces, the ball reached  $0.75 \times 0.3164h = 0.2373h$ . Still not small enough!
6. Finally, after 6 bounces, the ball's height was  $0.75 \times 0.2373h = 0.1780h$ , or 17.8% of its original height, which is less than 20%! So the answer is 6 bounces.