## Day 9: The Secret of the Slytherin Dungeons

### Your Mission

A silver-green envelope slides under the door of the Slytherin common room beneath the Black Lake. Inside is a message from Professor Snape:

*"Deep in the Slytherin dungeons lies the Silver Serpent Goblet that can make any drink poured into it taste good. To claim it, you must pass five chambers guarded by multi-step arithmetic puzzles. One wrong calculation will seal the dungeon doors. Use careful steps, work backward when needed, and prove your cunning."*

Torches flicker with emerald flames as the heavy stone door creaks open. Step inside. Your dungeon trial begins!

### Warm-Up: Your Tools For Today

You already know how to use ratios, geometry, and counting strategies. Today's challenges require multi-step arithmetic:

- **Step-by-Step Tracking:** Break big word problems into small, clear steps. Write down what you know after each step.
- **Cancel Equal Parts:** On a balanced scale, removing the exact same items from both sides keeps the scale balanced.
- **Work Backwards:** If you know the ending number and the steps taken to get there, start at the end and do the steps oppositely in reverse order ($+$ becomes $-$, $\times$ becomes $\div$).

**Quick Check:** Draco starts with some Galleons (wizard coins). He spends 5 Galleons on Chocolate Frogs, then doubles his remaining coins with a spell, and ends up with 14 Galleons. How many Galleons did he start with?



Write your answer: _____

**Challenge 1: Draco Malfoy's Balance**

In the first chamber, Draco Malfoy is weighing potion ingredients on a brass balance scale. On the first scale, 7 identical silver wands balance with 2 silver wands and a 30 g brass weight. On the second scale, 1 silver wand and 1 emerald quill balance with a 15 g brass weight. What is the weight of the emerald quill in grams?

(A) 6 g (B) 7 g (C) 8 g (D) 9 g (E) 10 g

**Hint:** Look at the first scale. Take away 2 silver wands from both sides. That leaves 5 silver wands balancing with 30 g. Find the weight of 1 wand first, then use the second scale.



**Challenge 2: The Slytherin Dormitories**

In the second chamber, Prefect Pansy Parkinson is assigning beds for 21 first-year Slytherin students in the dungeon dormitories. There are 5 large rooms that hold 3 students each, and a certain number of small rooms that hold 2 students each. If every room is completely full, how many small two-person rooms are there?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 6

**Hint:** First multiply $5 \times 3$ to see how many students fit in the large rooms. Subtract that number from 21 to find how many students still need a bed, then divide by 2.



**Challenge 3: The Arithmancy Lock**

The third chamber is blocked by an iron gate with a glowing number dial. Blaise Zabini reads the riddle carved into the stone: *"I chose a positive secret number, multiplied it by itself, added 1, multiplied the result by 10, added 3, and multiplied the result by 4. My final answer was 2012."* What secret number did Blaise choose?

(A) 11 (B) 9 (C) 8 (D) 7 (E) 5

**Hint:** Work backwards from 2012. Undo the steps in reverse order: divide by 4, subtract 3, divide by 10, subtract 1, and finally ask: "What number multiplied by itself gives this result?"



**Challenge 4: The Cauldrons of Felix Felicis**

In the fourth chamber, Professor Slughorn has 40 liters of liquid potion split between two cauldrons. First, he pours 5 liters from the first cauldron into the second cauldron. Next, he pours enough potion from the second cauldron back into the first cauldron to double the amount of potion in the first cauldron. Now, both cauldrons have the exact same amount of potion. How many liters of potion were in the second cauldron at the very beginning?

(A) 20 (B) 35 (C) 15 (D) 25 (E) 10

**Hint:** The total is always 40 liters, so at the end each cauldron has 20 liters. Work backwards. Before the first cauldron was doubled to 20 liters, how much did it have? Then undo the 5-liter pour.



**Challenge 5: The Basilisk's Guardian**

In the final chamber, a dragon guardian with many heads blocks the Silver Serpent Goblet. To defeat it, a Slytherin duelist must slice off all of its heads. Whenever the duelist slices off 3 heads, 1 new head immediately grows back! If the duelist defeats the guardian by slicing off 13 heads in total, how many heads did the guardian have at the very beginning?

(A) 8 (B) 9 (C) 10 (D) 11 (E) 12

**Hint:** Notice that you cannot cut off 3 heads at the very end if fewer than 3 heads are left. Every time 3 heads are sliced off, 1 regrows. So, the guardian actually loses $3 - 1 = 2$ heads per round. Keep track of the slicing and regrowth carefully!



**The Master Code**

You have solved all five dungeon chambers! Fill in the secret code to unlock the pedestal and claim the Silver Serpent Goblet.

**Word Bank:** BACKWARDS, BALANCE, MULTIPLY, OPPOSITE, STEPS

1. Break hard problems into small, clear _____ so you don't lose track.
2. On a scale that is in _____, removing the same weight from both sides keeps it equal.
3. When you know the final result, work _____ from the end to find the starting number.
4. To undo a step when working backwards, use the _____ operation.
5. Always add, subtract, _____, or divide carefully and double-check your final number.

**Mission Complete!**

The stone pedestal sinks into the floor, revealing the gleaming Silver Serpent Goblet. The Slytherin common room erupts into applause as Professor Snape gives a rare, approving nod. You have mastered multi-step arithmetic with true Slytherin strategy and precision. Now, go make some tasty drinks for the Slytherin house!

