# Algebra Round

30 minutes | 15 problems

1. A wizard needs to mix 30 milliliters of a potion. He uses two ingredients, Essence A and Essence B. Essence A is 3 times the amount of Essence B. How much of Essence A does the wizard need?

2. Professor Slytherin combined 6 potions in his lab; the average mass is 12 ounces. He then adds another potion, which makes the average mass 16 ounces. What is the mass of the last potion he added in ounces?

3. A magic wand costs $13, and a Spell Book costs $14. If Hermione spent $94 total and bought 7 items, how many wands did she buy?

4. Suppose all of Cinderella's shoes are auctioned for the same price, which is $\frac{2}{3}$ the cost of Harry's past brooms, which all are the same price. If Harry sold 18 of his brooms at the auction, how many shoes would Cinderella have to sell to make the same amount of money?

5. Medusa is trying to regenerate her magical poisonous snakes after Dumbledoor slaughtered them. She goes into a process of healing at 3:50 AM and stops at 4:15 AM, regenerating one third of the total snakes she originally had. If her snakes regenerate at the same rate, at what time in the morning will her snakes fully regenerate if she continues to heal at 6:00 AM nonstop with $\frac{1}{3}$ of her snakes already regenerated from 3:50 AM?

6. In the Smurf Land, Papa Smurf is noting a count of all the other smurfs in the village. He counts 856 mushrooms with an average of 4 smurfs in each mushroom. How many smurfs are there in total in Smurf Land?

7. Rapunzel's hair on July 1st was 2 yards long. On December 1st, her hair length was 246 inches long. Assuming that in the Tangled world each month has 35 days, what is the rate that Rapunzel can grow her hair in feet per week if it is constant throughout, as a simplified fraction?

8. Mickey Mouse offers to sell his special ear hats for $36.50. He then offers to take off 25% for Black Friday and an additional 10% of the 25% off after negotiating with Pluto. How much can his ear hats be bought for now? Round to the nearest cent.

9. Ron and Hermione run in opposite directions on a circular track, starting at diametrically opposite points. They first meet after Ron has run 100 meters. They next meet after Hermione has run 150 meters past their first meeting point. Each run at a constant speed. What is the length of the track in meters?

10. Ravenna The Witch's path through the air can be modeled by $p(t) = -3t^2 + 8t + 10$, where $p(t)$ is the height in the air and $t$ is the time passed. If you add the time and the height she was at the highest point of her travel, what would the value be as a simplified improper fraction?

11. In front of you, two jars appear from thin air because you are a magical Mathlete. Two jars each contain the same number of marbles, and every marble is either white or red. Jar A has a ratio of 9: 4 white marbles to red. Jar B has a ratio of 8: 3 white marbles to red. How many more white marbles does Jar B have than Jar A, if there are a total of 429 marbles?

12. An academic dementor threatens to suck Hermionies soul if she incorrectly answers this math problem: What is the sum of all real numbers $x$ for which the median of the numbers 2, 4, 9, 10, 11, 19 and $x$ is equal to the mean of those five numbers as a rounded integer? If Hermione is always correct, what should her answer be?

13. The Wizard of Oz has algebra notes that are 70 pages long on 35 sheets of paper; the first sheet contains pages 1 and 2 , the second sheet contains pages 3 and 4 , and so on. One day, Dorothy steals a consecutive set of sheets to pass her math test. When Oz comes back, the average page number increases by $\frac{4}{3}$. What is the sum of the first and last page number that Dorothy stole?

14. In Encanto, Mirabel steps on the ridges of La Casa's roof to save the candle. The Left side of La Casa has 30% more ridges than the right side, and the front-facing side has 20% less ridges than the right side. The ratio of ridges on the left side to the ridges on the front-facing side is $M: N$ simplified furthest. What is $M \times N$?

15. Tinkerbell travels in a parabola to avoid the smell of the mean people who did not believe in her. Her height can be represented as a function $h(t) = (t - 20)^2 + 7(t - 20) - 144$, where $t$ is time passed. At what time does Tinkerbell return back to her original height, at $t = 0$, after passing the stench?