**Lower Elementary:**

*Question:* On Monday, Magnus carves his very first wooden duck. On Tuesday, he practices by carving 3 more wooden ducks. The next day, he carves 5 more ducks. The day after that, he carves 7 more, and so on. If the pattern continues, on what day of the week will Magnus carve his 20th wooden duck?

****

**Upper Elementary:**

*Question:* Angus is making macarons. His recipe uses 13/4 cups of powdered sugar to make a batch of a dozen macarons. If Angus has 31/2 quarts of sugar, how many total macarons can he make?

****

**Middle School:**

*Question:* Sloane and Jerry are about to race their monster trucks. Sloane’s truck goes 60 miles per hour, while Jerry’s truck only goes 40 miles per hour. Jerry starts his truck as soon as the whistle blows, but Sloane’s engine stalls; and her truck doesn’t start back up until exactly a minute later. At what time after the whistle blows does Sloane catch up with Jerry?

**Algebra and Up:**

*Question:* Lucretia has a giant, cylindrical fish tank. The fish tank has a diameter of 9 feet and is 30 feet tall, including a 2 foot tall metal base which the glass tank sits upon. What is the volume of the fish tank? (Include π in your answer.)

(Hint: volume of a cylinder = π***r***2***h***)

**Lower Elementary:**

*Question:* On Monday, Magnus carves his very first wooden duck. On Tuesday, he practices by carving 3 more wooden ducks. The next day, he carves 5 more ducks. The day after that, he carves 7 more, and so on. If the pattern continues, on what day of the week will Magnus carve his 20th wooden duck?

*Answer:* Friday

*Solution:* Magnus’s pattern follows the odd numbers. According to the problem, Magnus has 1 + 3 + 5 + 7 = 16 by the end of his carving on Thursday. The next day, Friday, he must carve 9 more ducks. Because 16 + 9 = 25, and 25 is more than 20, he must carve the 20th duck on Friday.

**Upper Elementary:**

*Question:* Angus is making macarons. His recipe uses 13/4 cups of powdered sugar to make a batch of a dozen macarons. If Angus has 31/2 quarts of sugar, how many total macarons can he make?

*Answer:* 96 macarons

*Solution:* A quart is equal to 2 pints, or 4 cups. Angus has 31/2 quarts of powdered sugar, which is the same as (31/2 × 4) = (3 × 4) + (1/2 × 4) = 12 + 2 = 14 cups. There are 8 groups of 13/4 inside of 14, so Angus can make 8 batches with 14 cups of sugar. That would make 8 batches × 12 macarons = 96 macarons.

**Middle School:**

*Question:* Sloane and Jerry are about to race their monster trucks. Sloane’s truck goes 60 miles per hour, while Jerry’s truck only goes 40 miles per hour. Jerry starts his truck as soon as the whistle blows, but Sloane’s engine stalls; and her truck doesn’t start back up until exactly a minute later. At what time after the whistle blows does Sloane catch up with Jerry?

*Answer:* 3 minutes after the whistle blows

*Solution:* Sloane’s truck goes 60 ÷ 60 = 1 mile per minute. Jerry’s truck goes 40 ÷ 60 = 2/3 of a mile per minute. Their distances traveled can be charted.

|  |  |  |
| --- | --- | --- |
| **Minutes****after whistle** | **Sloane** | **Jerry** |
| **1** | 0 miles | 2/3 of a mile |
| **2** | 1 mile | 11/3 miles |
| **3** | 2 miles | 2 miles |

Sloane catches up to Jerry at the 3 minute mark.

**Algebra and Up:**

*Question:* Lucretia has a giant, cylindrical fish tank. The fish tank has a diameter of 9 feet and is 30 feet tall, including a 2 foot tall metal base which the glass tank sits upon. What is the volume of the fish tank? (Include π in your answer.)

(Hint: volume of a cylinder = π***r***2***h***)

*Answer:* 567π ft3

*Solution:* The diameter of the tank is 9 ft, so the radius is 4.5 ft. The height of the tank is 30 – 2 = 28 ft. This means that the volume of the tank is π(4.5)(4.5)(28) = 567π ft3.