**Lower Elementary:**

*Question:* Shoes are measured in half sizes. Cindy bought a pair of size 5$\frac{1}{2}$ shoes, but they were two sizes too small. What is Cindy’s correct shoe size?

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**Upper Elementary:**

*Question:* Max can pull an empty sled up Mount Calculus $\frac{1}{2}$ of kilometre every 20 minutes. The path he takes up the mountain is 3$\frac{1}{2}$ kilometres long. How long will it take Max to pull the sled all the way up Mount Calculus?

**Middle School:**

*Question:* There are 5 different wrapping papers. The first wrapping paper is used to wrap one present. The second wrapping paper is used to wrap 2 presents. The third wrapping paper is used to wrap 3 presents. The fourth wrapping paper is used to wrap 4 presents. The fifth wrapping paper is used to wrap 5 presents.

There are 3 more green presents than there are white. There is an even number of red presents and an odd number of striped presents. There are fewer polka dotted presents than white presents. How many of each type of present are there?

**Algebra and Up:**

*Question:* While making a snow angel on the edge of town, a Mathlete looks up to the top of Mt. Calculus at a 50° angle of elevation. If the edge of Mathville is 2$\frac{1}{4}$ kilometres from the base of Mt. Calculus, how tall is Mt. Calculus? Note: The side of Mt. Calculus that faces Mathville is perpendicular to the ground. (Round to the nearest tenth of a kilometre.)

**Lower Elementary:**

*Question:* Shoes are measured in half sizes. Cindy bought a pair of size 5$\frac{1}{2}$ shoes, but they were two sizes too small. What is Cindy’s correct shoe size?

*Answer:* 6$\frac{1}{2}$

*Solution:* Since the 5$\frac{1}{2}$ size pair of shoes were 2 sizes too small and shoe sizes go up by $\frac{1}{2}$, we need to count up by $\frac{1}{2}$ , two times; 6, 6$\frac{1}{2}$. Cindy wears a size 6$\frac{1}{2}$ shoe.

**Upper Elementary:**

*Question:*  Max can pull an empty sled up Mount Calculus $\frac{1}{2}$ of kilometre every 20 minutes. The path he takes up the mountain is 3$\frac{1}{2}$ kilometres long. How long will it take Max to pull the sled all the way up Mount Calculus?

*Answer:* 2$\frac{1}{3}$ hours or 2 hours and 20 minutes

*Solution:* Since $\frac{1}{2}$ goes into 3$\frac{1}{2}$ 7 times, it will take 7 × 20 minutes for Max to pull the sled up the mountain. Three 20 minutes make one hour, (20 + 20 + 20) + (20 + 20 + 20) + 20 = 1 hour + 1 hour + 20 minutes. So, it takes Max 2 hours and 20 minutes or 2$\frac{1}{3}$ hours to pull the sled up the mountain.

**Middle School:**

*Question:* There are 5 different wrapping papers. The first wrapping paper is used to wrap one present. The second wrapping paper is used to wrap 2 presents. The third wrapping paper is used to wrap 3 presents. The fourth wrapping paper is used to wrap 4 presents. The fifth wrapping paper is used to wrap 5 presents.

There are 3 more green presents than there are white. There is an even number of red presents and an odd number of striped presents. There are fewer polka dotted presents than white presents. How many of each type of present are there?

*Answer:* 1 polka dotted, 2 white, 3 striped, 4 red, and 5 green presents

*Solution:* Since there are 3 more green presents than there are white, there must be 4 or 5 green presents and 1 or 2 white presents. Since there are fewer polka dotted presents than white presents, there must be 2 white presents and 1 polka dotted present. This also means there are 5 green presents. Finally, there are an even number of red presents and the only even number left is 4, leaving us with 3 striped presents.

**Algebra and Up:**

*Question:* While making a snow angel on the edge of town, a Mathlete looks up to the top of Mt. Calculus at a 50° angle of elevation. If the edge of Mathville is 2$\frac{1}{4}$ kilometres from the base of Mt. Calculus, how tall is Mt. Calculus? Note: The side of Mt. Calculus that faces Mathville is perpendicular to the ground. (Round to the nearest tenth of a kilometre.)

*Answer:* 2.7 km tall

*Solution:* Sketch a picture of this problem.



Since the ground meets the base of the mountain at a 90° angle, we can use trig ratios to solve the problem.

tan 50° = $\frac{x}{2.25}$

***x*** ≈ 2.68 km or 2.7 km

Mt. Calculus is 2.7 km tall.