**Lower Elementary:**

*Question:* Nicholas is folding square napkins for Thanksgiving dinner. He first folds each napkin in half vertically. Next, he folds the napkins in half horizontally. Finally, he folds the napkins in half diagonally. What shape are the napkins when Nicholas finishes folding them?

**Upper Elementary:**

*Question:* Anna has a green bean casserole recipe that calls for 1/3 of a stick of butter, 1/2 a cup of sliced mushrooms, 2 cups of green beans, 3 cups of chicken broth, and 30 fl. oz. of cream of mushroom soup. The recipe makes enough casserole for 4 people, but there are 6 people in Anna’s family. How much of each ingredient does she need to have exactly enough green bean casserole?

**Middle School:**

*Question:* Matthew has a recipe for apple cider that calls for 24 apples and yields 5 cups of cider. How many apples should Matthew buy if he wants to fill a 12–cup pitcher with apple cider?

**Algebra and Up:**

*Question:* A cylindrical pumpkin pie is 10 inches in diameter, 2 inches deep, and cut into 6 slices. A cylindrical cheesecake is 12 inches in diameter, 3 inches deep, and cut into 10 slices. Which slices are bigger? By how much? Leave your answer in terms of π.

**Lower Elementary:**

*Question:* Nicholas is folding square napkins for Thanksgiving dinner. He first folds each napkin in half vertically. Next, he folds the napkins in half horizontally. Finally, he folds the napkins in half diagonally. What shape are the napkins when Nicholas finishes folding them?

*Answer:* a triangle

*Solution:* After Nicholas folds the square in half, he has a rectangle. After he folds the rectangle in half, he has a square again. After he folds the square in half along the diagonal, he has a triangle.

**Upper Elementary:**

*Question:* Anna has a green bean casserole recipe that calls for 1/3 of a stick of butter, 1/2 a cup of sliced mushrooms, 2 cups of green beans, 3 cups of chicken broth, and 30 fl. oz. of cream of mushroom soup. The recipe makes enough casserole for 4 people, but there are 6 people in Anna’s family. How much of each ingredient does she need to have exactly enough green bean casserole?

*Solution:* Since 6 is 4 × 11/2, we’ll need to multiply the amount of each ingredient by 11/2. So, Anna will need:

1/3 × 11/2 = 1/2 of a stick of butter

1/2 × 11/2 = 3/4 of a cup of mushrooms

2 × 11/2 = 3 cups of green beans

3 × 11/2 = 41/2 cups of chicken broth

30 × 11/2 = 45 fl. oz. of cream of mushroom soup

**Middle School:**

*Question:* Matthew has a recipe for apple cider that calls for 24 apples and yields 5 cups of cider. How many apples should Matthew buy if he wants to fill a 12–cup pitcher with apple cider?

*Answer:* 58 apples

*Solution:* Since 5 cups goes into 12 cups 12 ÷ 5 = 22/5 times, Matthew will need exactly 24 × 22/5 = 573/5 apples to make 12 cups of cider. Since Matthew can’t buy 3/5 of an apple, he’ll need to round up to 58 apples.

**Algebra and Up:**

*Question:* A cylindrical pumpkin pie is 10 inches in diameter, 2 inches deep, and cut into 6 slices. A cylindrical cheesecake is 12 inches in diameter, 3 inches deep, and cut into 10 slices. Which slices are bigger? By how much? Leave your answer in terms of π.

*Answer:* The cheesecake slices are 27/15π cubic inches bigger than the pumpkin pie slices.

*Solution:* The pumpkin pie has a volume of π × 52 × 2 = 50π cubic inches, so each slice has a volume of 50π/6 cubic inches. The cheesecake has a volume of π × 62 × 3 = 108π cubic inches, so each slice has a volume of 108π/10 cubic inches. The cheesecake slices are therefore 108π/10 – 50π/6 = 324π/30 – 250π/30 = 74π/30 = 27/15π cubic inches greater in volume than the pumpkin pie slices.