



## The Pumpkin Spice Latte Problem



### 16 oz Pumpkin Spice Latte (PSL)

- 2 shots espresso (60 mL)
- 1 cup milk (240 mL)
- 3 tablespoons pumpkin puree
- 1.5 tablespoons maple syrup, to sweeten
- 1 teaspoon pumpkin pie spice
- 1 teaspoon vanilla extract

(Note: 1 tablespoon=3 teaspoons, 2 tablespoons=1/8 cup)

What is the milk to espresso ratio in a pumpkin spice latte?

$$\frac{240}{60} = \frac{4}{1} \text{ or } 4:1$$

What is the pumpkin puree to milk ratio in a PSL?

$$3 \text{ tablespoons} = \frac{3}{2} (2 \text{ tbs}) = \frac{3}{2} \left(\frac{1}{8}\right) = \frac{3}{16} \text{ cup} \quad \frac{3}{16} : 1 \text{ or } 3:16$$

How many milliliters of espresso and milk are needed to make an 8 oz PSL?

$$\begin{array}{l} 30 \text{ mL of espresso} \\ 120 \text{ mL of milk} \end{array} \quad \frac{1}{2} \text{ size}$$

How many teaspoons of pumpkin puree are needed to make an 8 oz PSL?

$$1.5 \text{ tablespoons} = \boxed{4.5 \text{ tsp}}$$

Write the recipe for a 24 oz PSL.  $24 = 1.5(16)$

$$\begin{array}{ll} 3 \text{ shots espresso (90 mL)} & 1.5 \text{ tsp } \left(\frac{1}{2} \text{ tbs}\right) \text{ pumpkin pie spice} \\ 1.5 \text{ cups milk (360 mL)} & 1.5 \text{ tsp } \left(\frac{1}{2} \text{ tbs}\right) \text{ vanilla extract} \\ 4.5 \text{ tbs pumpkin puree} & \\ \frac{9}{4} (2\frac{1}{4}) \text{ tbs maple syrup} & \end{array}$$

Jenny has measured out all the ingredients to make 16 oz pumpkin spice lattes for herself and her friends. If she has 1200 mL of milk, how many tablespoons of maple syrup does she have? How many friends are joining her for lattes?

$$\frac{1200 \text{ mL}}{240 \text{ mL}} = 5 \text{ lattes}, \quad 1.5(5) = 7.5 \text{ tbs of maple syrup}$$

4 friends since she made 5 lattes and 1 is for herself.

Will a 28 oz PSL with  $\frac{3}{4}$  of a tablespoon of vanilla extract taste more or less vanilla-y than the original recipe? Explain.

$$\frac{28}{16} = \frac{7}{4} \text{ of the original recipe}$$

$$\text{orig: } 1 \text{ tsp, } 28 \text{ oz} \Rightarrow \frac{7}{4} \text{ tsp} = \frac{7}{12} \text{ tbs}$$

$$\frac{3}{4} = \frac{9}{12}$$

$$\frac{9}{12} > \frac{7}{12}$$

More vanilla-y