# Project: Unicorn Cake

MATH A104

Scenario: You have been selected to bake the birthday cake of a little girl who is about to turn three. This little girl has been begging for weeks for a unicorn cake, and you decide to indulge her. When looking up suggestions online on how to bake this cake, you found that most everyone suggests baking the cake in smaller circular cake pans that have a diameter of 6 inches. That’s the best way to get the height for the unicorn head. A normal circular cake pan (and the only kind you have) has a diameter of 9 inches. You need to buy cake pans. As an experienced baker, you know that the recipe you are planning on using usually fills two regular (9 inch) cake pans. How many 6-inch pans do you need to buy? (We’re going to assume that all cake pans are the same height.)

In this project, we will figure out how many 6 inch circular cake pans we’re going to need, assuming we’re sticking with the recipe we planned.

1. After reading the scenario, I hope you are already thinking about how you might solve this. What is some information presented in the scenario that we are going to use?
2. What is some information that you already know that might help? (Example: if we need to think about relating radius to diameter, write down that formula. What other formulas might we need?)

I see two ways to approach this problem. We can think about the diameter or we can think about the area. Let’s tackle the diameter first.

1. The recipe calls for two 9-in circular cake pans. What is the combined diameter of those cake pans?
2. How many 6-in circular cake pans will we need to obtain that same total diameter? (Show me the math.)
3. Is this a good way to judge how many 6-in cake pans we need? Why or why not?
4. Now let’s think about area. The recipe calls for two 9-in circular cake pans. What is the combined area of the bases of those cake pans?
5. How many 6-in circular cake pans will we need to obtain that same total area? (Show me the math.)
6. Is this a good way to judge how many 6-in cake pans we need? Why or why not?
7. In the scenario, we say that “assume all cake pans are the same height”. Why is that important?
8. What other assumptions or estimations, if any, are we making?
9. Finally, let’s answer the original question: how may 6-in circular cake pans do we need to not have overflow (overfull?) or too-shallow cakes?