

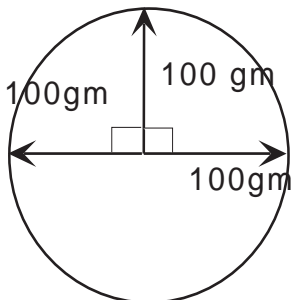
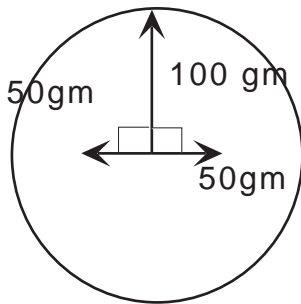
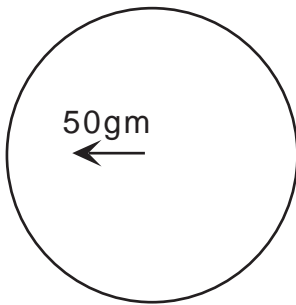
Names:

How do forces combine?

The question we want to answer in this exercise is how to add forces in order to get a net force of zero and no acceleration.

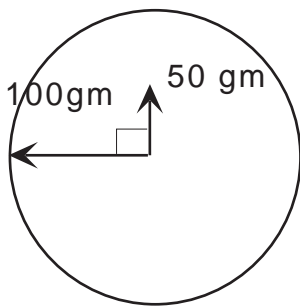
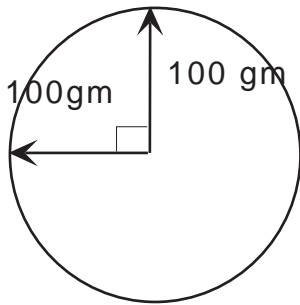
Equipment: The instructor will demonstrate the force table which we will use in the following activity.

1. For each of the following three scenarios, make an experienced guess at which angle you would hang an object to balance the ring. What should the mass of that object be? Sketch in your answer and verify by pulling the ring that it is balanced.



2. Did increasing the mass of the hanging objects in the x direction change the mass of the hanging object needed in the y direction?

3. For the following scenarios, make a reasoned guess (based on your answers from the last page) at which angle you would hang an object to balance the ring. What should the mass of that object be? Hint: if you could hang **two** weights in order to balance, where would you hang them and how big would they be? How can you combine those two weights into an equivalent single weight?



4. Explicitly as you can, describe how you have calculated the necessary mass and angle needed to balance the given objects. Be as general as possible.

5. Use the method that you just described to find the angle and mass of a balancing object in the following case:

