Centers of Mass of Candy Point Masses on a Plane – Class Handout

1. Using tape, attach two Hershey's Kisses® on the x-axis, one at $x = -1$ and one at $x = 3$. What is the balancing point of this system? In other words, at which point on the board could you put your finger underneath and have the board balance? (We call this point the *center of mass* of the system.) Discuss among your group, and then test out your answer.

2. Continuing Problem 1, attach an additional Hershey's Kiss to the point $x = -2$, and find the new center of mass of the system. Use your results to create a formula to find the center of mass of any number of Hershey's Kisses on a single axes.

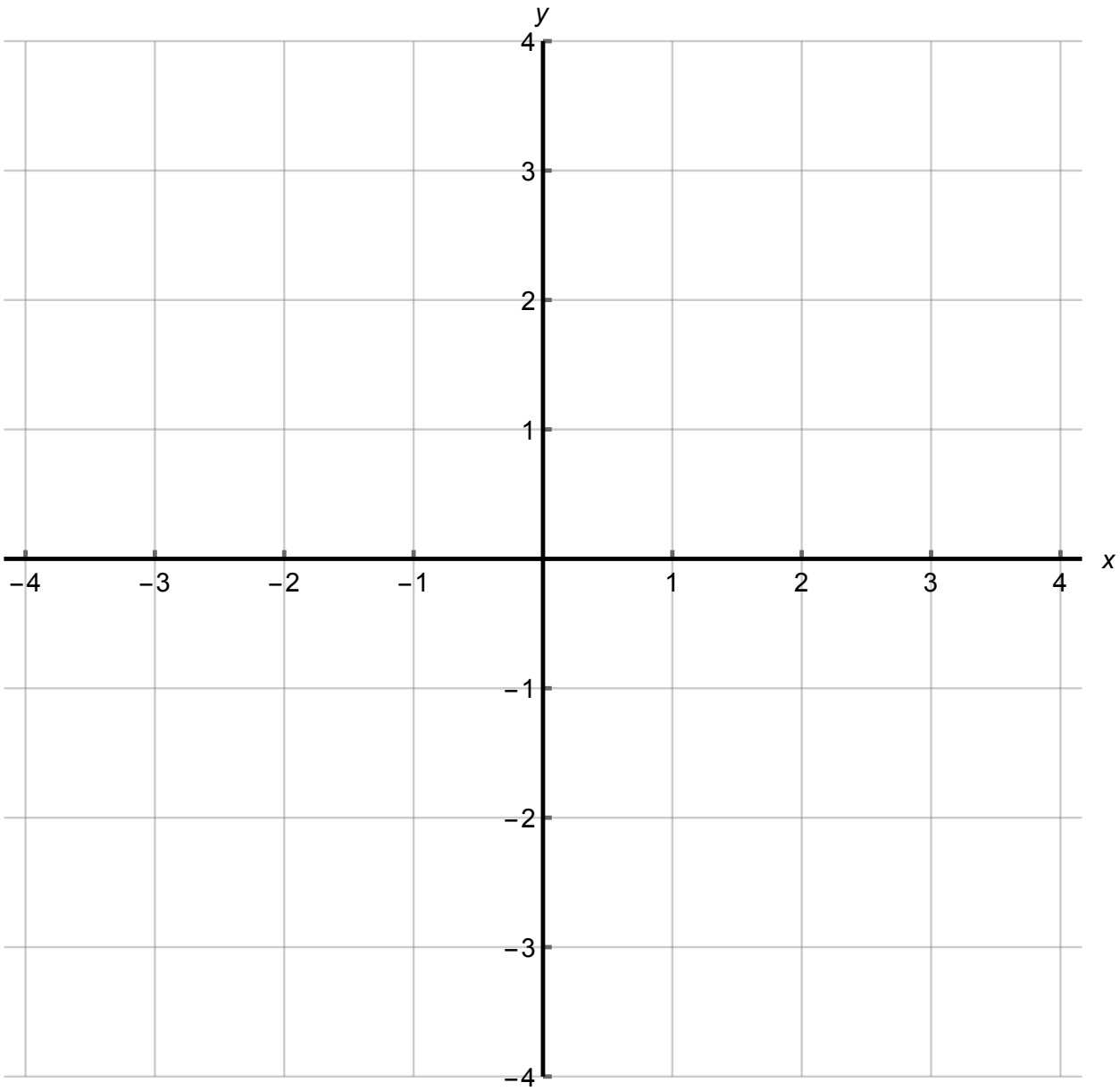
3. Now attach four Hershey's Kisses to the plane, one at each of the points $(0, 0), (0, 3), (-3, 0)$, and $(-3, 3)$. What is the center of mass of this system? Discuss and test your result. Then, develop a formula for finding the center of mass of any number of Hershey's Kisses placed on a Cartesian plane.

4. Would your formula still apply if you used all Starburst® instead of Hershey's Kisses? What if you used a mixture of Starburst and Hershey's Kisses? Discuss.

5. The *moment* of a point mass in the plane about an axis is its mass multiplied by the distance from the axis. For a mass of 2 grams at the point $(3, -2)$ the moment of the mass about the x-axis is $-2 \cdot 2 = -4$ and the moment of the mass about the y-axis is $3 \cdot 2 = 6$. Suppose you have a Hershey's Kiss at $x = -2$ and a Starburst at $x = 3$. A Starburst has a mass of approximately 5.05 grams and a Hershey's Kiss has a mass of 4.65 grams. Find the center of mass of the system. Create a formula for finding the center of mass of points of different masses on a single axis. Express your answer in terms of moments if you have not done so already.

6. Take three pieces of Starburst candy. Attach them at the points $(-2, 1), (2, -3)$, and $(3, 3)$. Take two Hershey's Kisses; attach them at the points $(-2, -3)$ and $(1, -1)$. Think about how you can use your answers from the previous problems to develop a formula and then use it to find the center of mass of this system. Test out your answer by seeing if your system will balance when you place your finger underneath the point you found.

Cartesian Plane Template – Top Plane



Cartesian Plane Template – Bottom Plane