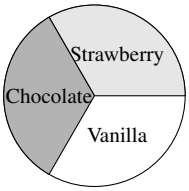
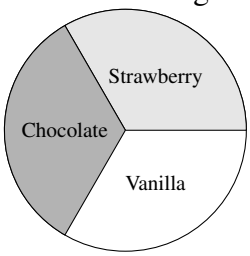
Goal: Review Divider-Chooser, Introduce Lone-Divider

1. Recall from the previous worksheet: Tom and Fred were given a cake worth \$12 that is equal parts strawberry, vanilla and chocolate, their respective values summarized in the chart.

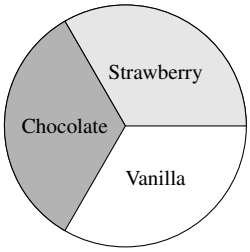
	vanilla	strawberry	chocolate
Tom	\$ 6	\$ 6	\$ 0
Fred	\$ 2	\$ 4	\$ 6



(a) Divide the cake using Divider-Choose assuming Tom is the divider. Determine the **value** of the assigned share to each party.



(b) Divide the cake using Divider-Choose assuming Fred is the divider. Determine the **value** of the assigned share to each party.



2. Is it better to be the Divider or the Chooser? Why?

3. Lone-Divider Method (for N people with $N \geq 3$).

   0. **Arbitrarily** pick a Divider.
   1. The Divider divides the items into N shares of equal value to them: $s_1, s_2, \cdots, s_N$.
   2. The remaining parties **declare** or **bid** on which the shares, $s_1, s_2, \cdots, s_N$, they consider fair.
   3. i. **IF** the N shares can be divided among the parties such that each gets a fair share, then do so.
      ii. **IF NOT**, then give the Divider a **non-contested piece**. Then restart Lone-Divider with $N-1$ parties: recombine the shares and re-divide.
      iii. Once you're down to 2 parties, use Divider-Chooser.

4. **Example 1** Suppose Patrick, Chris, and Travis are splitting a pile of football memorabilia estimated to be worth \$300. It has been split into 3 shares and their respective values are summarized in the table.

   (a) What is a fair share? _____

	s_1	s_2	s_3
Patrick	\$50	\$150	\$100
Chris	\$70	\$70	\$160
Travis	\$100	\$100	\$100

   (b) Circle or highlight each individual's **bid** (the shares they would consider to be fair).

   (c) Determine which person was the Divider.

   (d) Determine the next steps of the Lone-Divider Method.

5. **Example 2** Suppose Patrick, Chris, and Travis are splitting a pile of football memorabilia estimated to be worth \$300. It has been split into 3 (different) shares and their respective values are summarized in the table.

	t_1	t_2	t_3
Patrick	\$100	\$100	\$100
Chris	\$90	\$40	\$170
Travis	\$50	\$90	\$160

   (a) Circle or highlight each individual's **bid** (the shares they would consider to be fair).

   (b) Determine which person was the Divider.

   (c) Determine the next steps of the Lone-Divider Method.