

# Halloween

---

1. Bridgette wants to be a princess for Halloween. When she gets to the costume store, she realizes there are many options. There are five different crowns, eight different dresses and three different pairs of shoes. How many possible combinations are there for Bridgette's costume consisting of one crown, one dress and one pair of shoes?

(For #2 and #3) Joseph and Dante went trick-or-treating and came back with A LOT of candy. However, when Joseph's little sister, Samantha, gets back, they find that not only does she have more candy, but she has better candy than they do. Samantha agrees to trade some of the candy, but they have to follow her trading rules.

3 Smarties packs = 1 fun-size candy bar

2 Tootsie Pops = 1 Skittles pack

15 candy corns = 1 Smarties pack

5 candy corns = 2 Bit-O-Honeys

3 Tootsie Pops = 1 fun-size candy bar

2. Based on Samantha's exchange rates, what item is the most valuable?
3. How many of the least-valuable item are required to get 1 of the most-valuable item?
4. Before heading out to do some trick-or-treating, Molly had to choose which container to take with her to hold all of her candy. She had her plastic, spherical pumpkin with a radius of 5 inches, or a bag she found in the kitchen. The bag measured 5 inches by 9 inches by 11.5 inches and had the same shape as a rectangular prism when it was open. What is the volume, in cubic inches, of the container with the greatest volume? Express your answer as a decimal to the nearest tenth.



5. As Molly's mother was waiting for Molly to return from trick-or-treating, she started looking at the nutrition information on the bag from the candy she was distributing. For this bag of candy bars, a serving size is equivalent to four candy bars, there are eight servings per bag and 200 calories per serving. According to this information, how many calories are in one candy bar? How many calories are in all of the candy bars in an entire bag?
  
6. When Molly returned home from trick-or-treating, she spread all of her candy out on the kitchen table. She noticed that she had 14 Tootsie Pops, and she had at least one of exactly three different colors of Tootsie Pops (brown, red and purple). She had exactly twice as many purple as brown, and less than 25% of the 14 Tootsie Pops were brown. According to this information, what is the average value of the possible amounts of red Tootsie Pops she could have had?
  
7. Molly's mother started out the evening with three types of treats: candy bars, Tootsie Pops and Skittles packs in her Halloween candy bowl. The ratio "candy bars:Tootsie Pops:Skittles packs" was 8:5:7, respectively. If she had exactly 40 Tootsie Pops, how many total treats were in the bowl? (A treat is one candy bar, one Tootsie Pop or one Skittles pack.)
  
8. Based on the information above, if the first trick-or-treater to Molly's house picked one treat from the bowl at random, what was the probability he was going to pick out a Skittles pack? Express your answer as a percent.
  
9. Molly was allowed to trick-or-treat from 6:30 p.m. until 8:45 p.m. If she averaged visiting 2 houses every 9 minutes during that time, how many houses did she visit?
  
10. Molly's mother had 6 different groups of kids with 3 or more kids in each group come to her door for candy. When looking at the numbers of kids per group, the average was 6, the unique mode was 4, the median was 4.5 and the range was 10. If the largest group to come to the door was as large as possible, how many kids were in the second-largest group to visit Molly's house that night?



# Halloween

1. Bridgette wants to be a princess for Halloween. When she gets to the costume store, she realizes there are many options. There are five different crowns, eight different dresses and three different pairs of shoes. How many possible combinations are there for Bridgette's costume consisting of one crown, one dress and one pair of shoes?

**Each of the 5 different crowns could be matched with any of the 8 different dresses, and any of those matches can be matched with any of the 3 different pairs of shoes. So, there are  $5 \times 8 \times 3 = 120$  possible combinations.**

(For #2 and #3) Joseph and Dante went trick-or-treating and came back with A LOT of candy. However, when Joseph's little sister, Samantha, gets back, they find that not only does she have more candy, but she has better candy than they do. Samantha agrees to trade some of the candy, but they have to follow her trading rules.

- 3 Smarties packs = 1 fun-size candy bar
- 2 Tootsie Pops = 1 Skittles pack
- 15 candy corns = 1 Smarties pack
- 5 candy corns = 2 Bit-O-Honeys
- 3 Tootsie Pops = 1 fun-size candy bar

2. Based on Samantha's exchange rates, what item is the most valuable?

**Fun-size candy bar.**

3. How many of the least-valuable item are required to get 1 of the most-valuable item?

**The least valuable item is the candy corn. Knowing 15 candy corns = 1 Smarties pack, and 3 Smarties packs = 1 fun-size candy bar (the most-valuable item),  $15 \times 3 = 45$  candy corns.**

4. Before heading out to do some trick-or-treating, Molly had to choose which container to take with her to hold all of her candy. She had her plastic, spherical pumpkin with a radius of 5 inches, or a bag she found in the kitchen. The bag measured 5 inches by 9 inches by 11.5 inches and had the same shape as a rectangular prism when it was open. What is the volume, in cubic inches, of the container with the greatest volume? Express your answer as a decimal to the nearest tenth.

**Since the pumpkin is a sphere with radius 5", the volume is  $\frac{4}{3} \times \pi \times 5^3 = 523.6$  cubic inches. The volume of the bag is  $5 \times 9 \times 11.5 = 517.5$  cubic inches. So, Molly should go with the **pumpkin**.**

5. As Molly's mother was waiting for Molly to return from trick-or-treating, she started looking at the nutrition information on the bag from the candy she was distributing. For this bag of candy bars, a serving size is equivalent to four candy bars, there are eight servings per bag and 200 calories per

serving. According to this information, how many calories are in one candy bar? How many calories are in all of the candy bars in an entire bag?

**If there are 200 calories per serving and a serving is four candy bars, then one candy bar has  $200 \div 4 = 50$  calories. The bag, however, has eight servings at 200 calories each, which is  $8 \times 200 = 1600$  calories.**

6. When Molly returned home from trick-or-treating, she spread all of her candy out on the kitchen table. She noticed that she had 14 Tootsie Pops, and she had at least one of exactly three different colors of Tootsie Pops (brown, red and purple). She had exactly twice as many purple as brown, and less than 25% of the 14 Tootsie Pops were brown. According to this information, what is the average value of the possible amounts of red Tootsie Pops she could have had?

**We know that she has at least one of each color. Since less than 25% of the Tootsie Pops are brown, she must have 1, 2, or 3 brown ones. Four brown ones would be over 28% of the Pops. If she has one brown, she has  $2 \times 1 = 2$  purples and therefore  $14 - (1 + 2) = 11$  red. If she has two brown, she has  $2 \times 2 = 4$  purples and therefore  $14 - (2 + 4) = 8$  red. If she has three brown, she has  $2 \times 3 = 6$  purples and therefore  $14 - (3 + 6) = 5$  red. The average value of 11, 8, and 5 is  $(11 + 8 + 5) / 3 = 8$  red Tootsie Pops.**

7. Molly's mother started out the evening with three types of treats: candy bars, Tootsie Pops and Skittles packs in her Halloween candy bowl. The ratio "candy bars:Tootsie Pops:Skittles packs" was 8:5:7, respectively. If she had exactly 40 Tootsie Pops, how many total treats were in the bowl? (A treat is one candy bar, one Tootsie Pop or one Skittles pack.)

**The constant of proportionality, found by looking at the amount of Tootsie Pops, is  $40 / 5 = 8$ . So,  $8 \times 8 = 64$  candy bars, and  $7 \times 8 = 56$  Skittles packs.  $40 + 64 + 56 = 160$  treats.**

8. Based on the information above, if the first trick-or-treater to Molly's house picked one treat from the bowl at random, what was the probability he was going to pick out a Skittles pack? Express your answer as a percent.

**The probability of the first trick-or-treater picking out a Skittles pack is the number of Skittles packs divided by the total number of treats,  $56 / 160 = 0.35$  which is  $0.35 \times 100 = 35\%$ .**

9. Molly was allowed to trick-or-treat from 6:30 p.m. until 8:45 p.m. If she averaged visiting 2 houses every 9 minutes during that time, how many houses did she visit?

**The time between 6:30 p.m. and 8:45 p.m. is 2 hours 15 minutes, which is equal to  $(60 \times 2) + 15 = 135$  minutes.  $135 / 9 = 15$  sets of 9 minutes during this time. Since she visited, on average, 2 houses every 9 minutes,  $15 \times 2 = 30$  houses.**

10. Molly's mother had 6 different groups of kids with 3 or more kids in each group come to her door for candy. When looking at the numbers of kids per group, the average was 6, the unique mode was 4, the median was 4.5 and the range was 10. If the largest group to come to the door was as large as possible, how many kids were in the second-largest group to visit Molly's house that night?

If the average number of kids in each group is 6, then the sum of the number of kids in all the groups must equal 36, because  $36 / 6 \text{ groups} = 6$ . Knowing the median of an even number of values is 4.5, the middle of the ordered set must fall between a 4 and a 5. With 4 as the mode, 10 as the range, and keeping all of the values at 3 or above, the values 4, 4, 4, 5, 5, and 14 are the numbers of kids in the groups that could make this scenario true. So, the group with the second-largest number of kids had **5** kids.