First Name: _____	**Last Name:** _____	**Grade:** _____
Teacher: _____	**Parent's email:** _____	

Autumn Medley

Welcome to the Math Challenge #3. In this challenge, we will solve problems involving autumn, its beauty, and fun and joyful holidays. Autumn, also known as Fall, is one of the four seasons. In North America, autumn traditionally starts with the September equinox. Many cultures feature autumnal harvest festivals, often the most important on their calendars. Thanksgiving holiday of the United States and Canada, and the Jewish Sukkot holiday with its roots as a full-moon harvest festival. There are also the many festivals celebrated by indigenous peoples of the Americas tied to the harvest of ripe foods gathered in the wild. There are also the Chinese Mid-Autumn or Moon festival, Diwali and many others.

In North America, most foods are harvested during the autumn, and foods that are usually associated with the season include pumpkins and apples.

Every autumn we also enjoy the beauty of the fall colors. The mixture of red, purple, orange and yellow is the result of chemical processes that take place in the tree as the seasons change from summer to winter. These are just some fun facts about fall leaves.

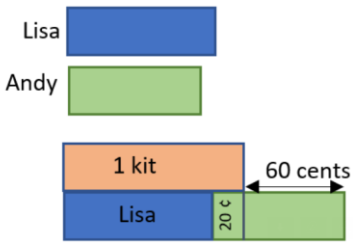
Leaves contain various chemical pigments that affect their color. The main ones are:

- Chlorophyll – responsible for the color green,
- Xanthophyll – responsible for the color yellow,
- Tannins – responsible for the color brown,
- Carotene – responsible for the color orange and yes, present in carrots.

The redder is the leaf, the more sugar that leaf is storing. That is why Maple trees are so vibrant. Evergreens don't change because their leaves have a thick wax covering that protects the chlorophyl (green) in the leaves.

Kinder & First Grade: solve <u>at least</u> 3 problems.
Second & Third Grade: solve <u>at least</u> 7 problems.
Fourth Grade and above: solve <u>at least</u> 12 problems.

		Answer
1.	How many **vowels** are between the first and the last letter of Halloween?	*4*
2.	Megan is making patterns with leaf stamps, stamping them in a line. Oak leaf was 4th from the one end, and 7th from the other end. How many leaves were stamped in a line? *3 in front, 6 behind, and 1 oak leaf make a total of 3+6+1 = 10 leaves* 	*10 [leaves]*
3.	There are 10 houses on your street and all but 1 expect trick-o-treaters. How many houses have candies, are decorated, and ready to greet trick-o-treaters?	*9 [houses]*
4.	September has 30 days, October 31 days. How many months in a year have at least 28 days?	*12 [all of them]*
5.	Thirty one fourth-grade students are going to a pumpkin patch. Each van can hold ten people. Five chaperones are going on the trip with the students. How many vans are needed to take the students to the pumpkin patch?	*4 [vans]*

6.	Since 1 pitcher can fill 10 cups, 3 pitchers can fill 30 cups. 30 cups × 50 cents = $15 	*$15 or $15.00*
7.	One way is to guess and check, and another way is to make an organized list of possibilities. 3 three-horned deer, 7 two-horned bisons 3×3 =9 horns for three-horned deer 7×2 = 14 horns for two-horned bisons 2×1 = 2 horns for unicorns. Check: in total there are 9 + 14 + 2 = 25 horns and 3 + 7 + 2 = 12 creatures	*Bisons: 7* *Three-horned deer: 3*
8.	Ground floor = 0 0 + 7 – 5 + 10 – 8 + 3 – 5 = 2	*2nd [floor]*
9.	 From the first clue, we know that the number of ghosts are more than 31. From the second clue, it has to be less tan 35. So, the number we are looking for is between 31 and 35 and it is an odd number. It must be 33.	*33*
10.	a. How many bags of Halloween treats did she buy? *6* b. How many toys did she buy? *4* 6 x $12 + 4 x $7 = $72+$28 =$100	*a. 6 [bags of treats]* *b. 4 [toys]*
11.	If we add the known weights: 10 + 20 + 24 = 54 kg (this is the total weight of 2 hats, 2 cats, and 2 pumpkins). Thus, 1 hat, 1 cat and 1 pumpkin weigh 27 kg.	*27 [kg]*
12.	1 + 2 = 34 2 + 3 = 22 3 + 4 = 26 First bag has 20 candies, Second 34 – 20 = 14 candies, Third 22 – 14 = 8, Fourth 26- 8= 18 candies.	*1st bag: 20 [candies]* *2nd bag: 14 [candies]* *3rd bag: 8 [candies]* *4th bag: 18 [candies]*
13.	If you give Lisa 20 cents, she will be able to buy 1 kit by herself; if you lend Andy 30 cents, he will be able to buy his own kit. So, it is 2 kits in total, because we gave them 20 and 30 cents, they can afford the 2 kits. But without the 50 cents, they could afford only 1 kit and have 60 cents left over. Thus, one kit is $1.10. Here is what it looks like if we draw it out:  Notice that Andy had 80 cents. Since he was 30 cents short, we now know that the kit cost 80 cents + 30 cents = $1.10	*$1.10*

14. 

Jar + honey = 16
jar + apple juice = 10 → Jar + honey/2 = 10
It means that honey/2 = 16 – 10 = 6.
Half honey weighs 6 ounces, which means all the honey weighs 12 ounces, thus, the jar weighs 4 ounces.

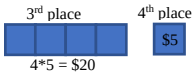
4 [ounces]

15. 5 pears = 2 apples
2.5 pears = 1 apple → 2.5 pears = 1 pear + 120 gr
1.5 pear = 120 gr
3 pears = 240 gr
1 pear = 80 grams

80 [grams]

16. Note: draw it out

3rd place : 4th place
4 : 1
$20 : $5



2nd place : 3rd place
3 : 1 ×4
12 : 4
$60 : $20

1st place : 2nd place
2 : 1
24 : 12
$120 : $60

First place prize is $120

$120 [1st prize]

17. 48 = 1*48 = 2*24 = 3*16 = 4*12 = 6*8
30 = 1*30 = 2*15 = 3*10 = 5*6
When you analyze possible number of rows and columns, you'll see that there are 12 rows of pears (4 pears in each row) and 6 rows of apples (5 apples in each row)
12 + 6 = 18 rows

12 [rows of pears]

6 [rows of apples]

18. Estimate means, it could be either less or more than the actual height. Because we don't know what estimates was off by what number, we need to think about all possible combinations.
Let's make a table.

344	344+ 6 = 350	344 – 6 = 338	344+ 12 = **356**	344 - 12 = 332	344+ 4 = 348	344- 4 = 340
362	362 + 6 = 368	362 – 6 = **356**	362 + 12 = 374	362 - 12 = 350	362 + 4 = 366	362 - 4 = 358
352	352 + 6 = 358	352 – 6 = 342	352 + 12 = 364	352 – 12 = 340	352 + 4 = **356**	352 - 4 = 348

356 [cm]

Solution is available on November 5, 2021

Student Registration for Fall 2021 Math Challenge Tournament is now available.