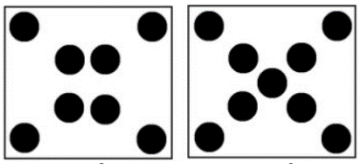
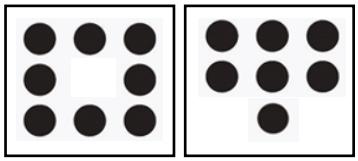
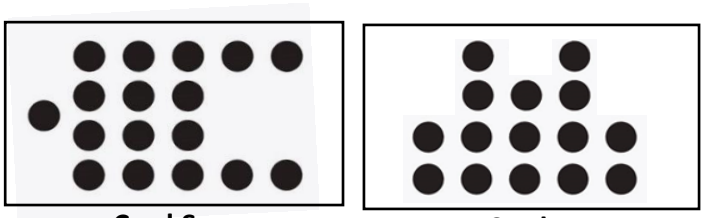
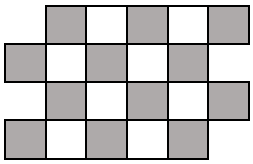
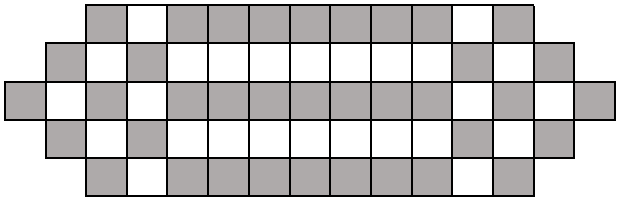
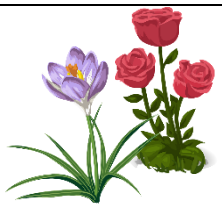
Math Challenge #4

How Much More or How Many More?

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.	Michael draws the following shapes:  **Which shape did he draw the most?**	*Triangle*
2.	**Which card has more dots and by how many?** *Find a way or ways to figure out how many dots in each card without counting one by one.* **a)**  **Card A** **Card B** **b)**  **Card M** **Card N** **c)**  **Card S** **Card T**	*a. Card B, by 1* *b. Card M, by 1* *c. Card S, by 2*
3.	 **How many more shaded squares than non-shaded squares are there in the picture?** Shaded square – non-shaded squares = 12 – 8 = 4 **There are 4 more shaded squares than non-shaded squares.**	*4 [squares]*
4.	There are 4 rows of smiley faces. Some of the smiley faces are partially covered and fully covered by a splat of ink. **How many more smiley faces are covered than the ones that are not covered by the splat?**  There are 4 x 7 = 28 smiley faces in all. The number of smiley faces that are covered by the splat is 3 x 5 = 15 and the ones that are not covered by the splat is 28 – 15 = 13. There are 15 – 13 = **2 more smiley faces covered than the ones not covered by the splat.**	*2*
5.	 Annie has 25 toy cars and Fran has 32 toy cars. Jack has 4 fewer toy cars than Fran. **Who has more toy cars, Annie or Jack, and by how many?** Annie = 25; Fran = 32 Jack = 32 – 4 = 28 cars. **Jack has 28 – 25 = 3 more toy cars.**	*Jack by 3 [cars]*

6.	**How many more shaded squares than non-shaded squares are there?** *Hint: think of a way to solve without counting each square one by one.*  Shaded squares – non-shaded squares = (8 + (7 x 3) + 8) – (6 + (7 x 2) + 6) = 37 – 26 = 11	*11*
7.	Kylee planted 17 roses and 24 tulips. Maya planted 21 roses and 18 tulips. **Who planted more flowers and by how many?** Kylee planted 17 + 24 = 41 flowers Maya planted 21 + 18 = 39 flowers **Kylee planted 2 more flowers than Maya.** 	*Kylee by 2 [flowers]*
8.	 Karla has 21 more books than Joe. Eric has 15 fewer books than Karla. If Karla has 29 books, **who has more books, Joe or Eric, and by how many?** Karla = 29 books Joe = 29 – 21 = 8 books Eric = 29 – 15 = 14 books 14 – 8 = 6 books Eric has 6 more books than Joe	*Eric by 6 [books]*
9.	Connor and Camilla have some blue and red marbles. Connor has 15 red marbles and some blue marbles. He has 13 more blue marbles than red ones. Camilla has 28 blue marbles. She has 13 more blue marbles than red ones. **Who has more marbles and by how many?** Connor = 15 red marbles + (13 + 15) blue marbles = 43 marbles Camilla = 28 blue marbles + (28 – 13) red marbles = 43 marbles They both have the same number of marbles.	*None. They both have the same number of marbles.*
10.	Max walked 167 meters from his home to the ice cream shop. He then went to the library, walking another 281 meters. **How much shorter or longer in distance did he walk if he walked directly from his home to the library?**  Direct: 389 meters Not direct route: 167 + 281 = 448 meters If he went directly from his home, it would be 448 - 389 = 59 meters shorter in distance.	*59 [meters] shorter* *or* *Shorter, by 59 [meters]*
11.	This year, Mr. Jekyll is 36 years old. 1/4 of his age is equal to 1/3 of Mr. Hyde's age. Who is older, Mr. Jekyll or Mr. Hyde, and by how many years? 1/4 of Mr. Jekyll's age is 9. Since 9 is 1/3 of Mr. Hyde's age, Mr. Hyde is 3 x 9 = 27 years old. Mr. Jekyll is older by 36 – 27 = 9 years.	*Mr. Jekyll is older by 9 years*

12. 

Kaya paid $9 for 3 cookies and 5 cupcakes. A cupcake cost three times as much as a cookie. How much more a cupcake costs than a cookie?

5 cupcakes in terms of cookies = 15 cookies,
Thus, Kaya paid $9 for 18 cookies, 1 cookie costs 50¢.
1 cupcake costs 3 times the cost of cookie, thus, 1 cupcake is $1.50. $1.50 - $0.50 = $1 more for cupcake

$1 more

13. The length of string A is 2 1/4 inches longer than string B. String C is 1/2 inch longer than string B. The total length of all three strings is 15 inches. Which string is longer, A or C, and by how much longer?

A = length of B + 2 1/4 inches
B = length of B
C = length of B + 1/2 inches

Total = 15 inches = 3 lengths of B + $2\frac{1}{4} + \frac{1}{2}$
→3 lengths of B = $15 - 2\frac{3}{4} = 12\frac{1}{4}$
1 length of B = $\frac{(12\frac{1}{4})}{3} = \frac{49}{4} \div \frac{3}{1} = \frac{49}{4} \times \frac{1}{3} = \frac{49}{12} = 4\frac{1}{12}$
A = 4 1/12 + 2 1/4 = 6 1/3, C = 4 1/12 + 1/2 = 4 7/12
A – C = 6 1/3 – 4 7/12 = 1 3/4

A is longer by 1 ¾ inches

14. Simone and Michelle had 150 tickets to sell altogether. After Simone sold 1/3 of her tickets and Michelle sold 35 tickets, they had the same number of tickets left. Who had more tickets at the beginning, Simone or Michelle, and by how many more?

Simone
Michelle +35
150 tickets

Do the drawing. 150-35 = 115 tickets make 5 units. 1 unit = 23 tickets. Michelle had 23×2 + 35 = 81 and Simone had 23×3=69 tickets at the beginning. Michelle had 81 – 69=12 more tickets at the beginning.

Michelle had 12 more tickets.

15. The product of the ages of 4 elementary school students is 5040. A is older than B by a year. B is older than C by a year. C is older than D by a year. What are the ages of the students?

A = B +1 = D +3
B = C+1 = D+2
C = D+1
D = D, A is the oldest, D is the youngest.
Prime factorization of 5040 = 2x2x2x2x3x3x5x7 Now do some guess and check.
The oldest student A is 10, the youngest student D is 7, B = 9, C = 8.

A is 10 [years old]
B is 9 [years old]
C is 8 [years old]
D is 7 [years old]

16. Paul wanted to make two pumpkin pies for a party. His mother, a professional pie maker, had a recipe for him to use. However, she always made 80 pumpkin pies at a time. Below is her recipe:

10 dozen eggs
27 liters of condensed milk
480 tablespoons of sugar
100 teaspoons of cinnamon
140 cups of pumpkin

Paul looked int the cupboard and found the following:
4 cups of pumpkin, 2 eggs, 1 1/2 teaspoons of cinnamon, 0.66L of condensed milk, 15 tablespoons of sugar.
Which ingredients would Paul need to buy to make the two pies?

Make a chart:
We can either calculate the answer by dividing the ingredient by 80 and multiplying by 2 or divide his mother's recipe by 40.

80 pies take	What he needs	What he has got
120 Eggs	3 eggs	2 eggs
27L Milk	0.675L Milk	0.66L Milk
480 tbs. Sugar	12 tbs. Sugar	15 tbs. Sugar
100 teasp. Cinnamon	2.5 teasp Cinnamon	1.5 teasp Cinnamon
140 cups of Pumpkin	3.5 cups of Pumpkin	4 cups of Pumpkin

Egg, milk, cinnamon

17. M contains a list of whole numbers from 100 to 1,000 whose digits are either 4 or 8. N contains a list of whole numbers from 1 to 500 that is a at the same time multiple of 7, a multiple of 9, and a multiple of 6.
Which has more numbers, M or N? By how much?

The list for M: 444, 448, 484, 844,488, 884, 848, 888 → 8 numbers.
If a number is a multiple of 7 and a multiple of 9, then it must be a multiple of 7 x 9 = 63.
The list for N: the numbers that is a multiple of 7 and 9 are 63, 126, 189, 252, 315, 378, 441.
Only three of these numbers are also a multiple of 6: 126, 252, 378. **M – N = 8 – 3 = 5 numbers.**

M has more, by 5 numbers.

18.	The Wilkinson family has 5 children. The sum of squares of two of the children's age is 365. The sum of squares of the other 3 children's age is also 365. How much older is the oldest as compared to the youngest? This problem may use a bit guess and check or logical approach. The average of the two children's ages = 365/2 = 182.5, so the squares of the kids ages must be around this number. 10^2=100, 11^2=121, 12^2=144, 13^2=169, 14^2=196, 15^2=225. Think of some square numbers, for which it is possible to get the sum of 365 (13^2 and 14^2). $13^2 + 14^2 = 169 + 196 = 365$. For the three children: the average square = 365/3 = 121, so the possible square numbers are 10^2, 11^2, and 12^2. $10^2 + 11^2 + 12^2 = 100 + 121 + 144 = 365$ Oldest – youngest = 14 – 10 = **4 years** **Another solution:** $\mathbf{2^2 + 19^2 = 365}$ ***and*** $\mathbf{4^2 + 5^2 + 18^2 = 365}$. The ages of the children can be 2, 4, 5, 18 and 19. So the age different can be 19 – 2 = 17.	*4 years or 17 years*

Solution is available on November 22, 2019 at www.mathinaction.org

Good luck to all who are participating at the MCT this year!