

Dr. Li's Fun Math Contest GR7&8 Sample Contest (2018)

Name: _____ Grade: _____ School: _____

Note: All your scratch work counts for full credit. Answer without a trace may not receive any credit. This packet will be collected for consideration of full or partial credit.

Section 1: Multiple Choice (300 points / 30 min)

1. Which of the answer choices does NOT represent an expression equivalent to the following:

$$E = \frac{\frac{5}{6}}{\frac{7}{11}}$$

- A) $5 \times 11 \div 6 \div 7$
 B) $5 \div 6 \div 7 \times 11$
 C) $11 \div 7 \times 5 \div 6$
 D) $5 \div 6 \div 7 \div 11$
 E) $5 \div 7 \times 11 \div 6$

2. The binary operator ∇ has the following behavior:

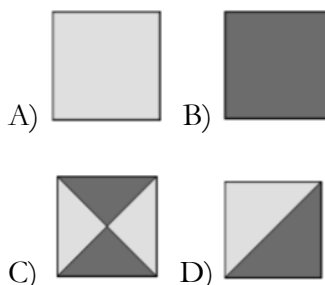
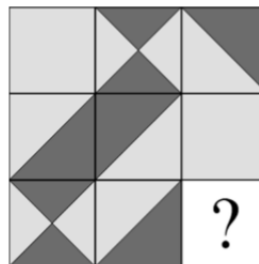
$$7\nabla 3 = \frac{7-3}{7+3} = \frac{4}{10} = \frac{2}{5}$$

Which of the following operations does

NOT equal $\frac{3}{7}$?

- A) $5\nabla 2$
 B) $15\nabla 6$
 C) $10\nabla 4$
 D) $25\nabla 10$
 E) $20\nabla 6$

3. Which tile must be added to the picture so that the light grey area is as large as the black area?



- E) It is impossible.

4. The positive integers have been colored red, blue or green:
 1 is red, 2 is blue, 3 is green,
 4 is red, 5 is blue, 6 is green, and so on.
 Renate calculates the sum of a green number and a blue number. Which of the following number can be the same color as this resulting number?

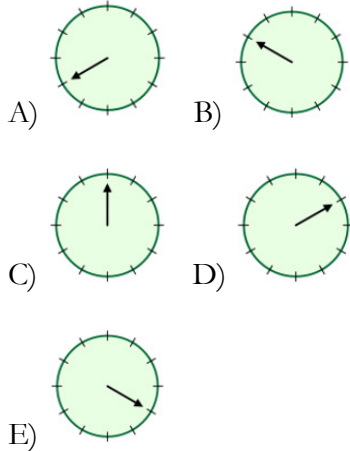
- A) 11
 B) 13
 C) 15
 D) 21
 E) 31

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5. Ann rides her bicycle throughout the afternoon with constant speed. At the beginning and at the end of the route, her watch shows the time, as in the diagram:



Which picture shows the position of the minute hand when Ann finishes one third of the ride?



6. Henry and John started walking from the same point. Henry went 1 km north, 2 km west, 4 km south and finally 1 km west. John went 1 km east, 4 km south and 4 km west. Which of the following must be the final part of John's walk so that he could reach the same point as Henry?
- A) He has already reached the same point.
 B) 1 km north.
 C) 1 km north-west.
 D) More than 1 km north-west.
 E) 1 km west.

7. Several cells of a 4×4 table were colored grey. The number of grey cells in each row was indicated to the right of it. The number of grey cells in each column was indicated at the bottom of it. Then the grey color was washed down. Which of the following tables can be the result?

				4
				2
				1
				1

A) 0 3 3 2

				1
				2
				1
				3

B) 2 2 3 1

				3
				3
				0
				0

C) 1 3 1 1

				2
				1
				2
				2

D) 2 1 2 2

				0
				3
				3
				1

E) 0 3 1 3

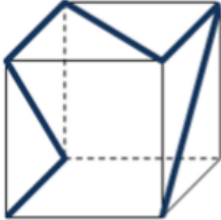
8. A rectangle has an area of 12 cm^2 . Its sides are of integer lengths in centimeters. Which of the following values could not be the perimeter of the rectangle?
- A) 14 cm
 B) 16 cm
 C) 20 cm
 D) 26 cm

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9. Which of the following fractions is equivalent to a terminating decimal?

- A) $\frac{2}{300}$
- B) $\frac{2}{325}$
- C) $\frac{2}{425}$
- D) $\frac{2}{525}$
- E) $\frac{2}{625}$

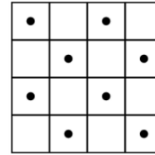
10. A thin colorful ribbon is stuck on a transparent plastic cube (see the picture).








Which of the following pictures does not represent the cube as seen from any perspective?

- A) 
- B) 
- C) 
- D) 
- E) 

11. Which of the following pieces can cover the largest number of dots in the table?



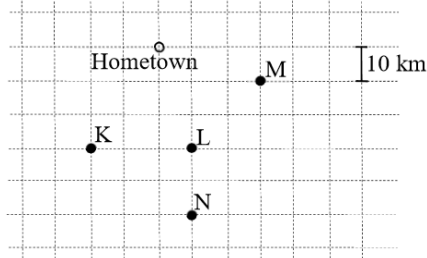
- A) 
- B) 
- C) 
- D) 
- E) 

12. Boris has an amount of money and three magic wands that he can use only once. Wand A adds \$1. Wand S subtracts \$1. Wand D doubles the amount. In which order must he use these wands to obtain the largest amount of money?

- A) DAS
- B) ASD
- C) DSA
- D) ADS
- E) SAD

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13. Bob is going to visit four cities. He will start from and end up in his home town. The figure shows a map of the regions with the cities. The roads are only along the grid lines.



Bob wants to make the trip as short as possible. Which route should Bob follow?

- A) M,L,N,K
 - B) K,L,M,N
 - C) N,M,L,K
 - D) L,N,K,M
 - E) K,L,N,M
14. You can choose any two triangles and overlap them as you want. Which of the following polygons cannot be the shape of the overlapping part?
- A) a triangle
 - B) a quadrilateral
 - C) a pentagon
 - D) a hexagon
 - E) any of the polygons in (A), (B), (C), (D) can be obtained

15. Esha had a whole number that she multiplied by 7. Then, she divided the result by 111 and obtained a whole number answer. What is the smallest number that this answer can be?

- A) 1
- B) 3
- C) 7
- D) 9
- E) 37

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Section 2: Open-Ended (300 points / 30 min)

16. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 6.2 cm, 8.3 cm and 9.5 cm. Find the area of the square.
17. If you walk for 45 minutes at a rate of 4 mph and then run for 30 minutes at a rate of 10 mph, how many miles have you gone at the end of one hour and 15 minutes?
18. Find the difference between a 6.5% sales tax and a 6% sales tax on an item tagged \$20.
19. How many whole numbers between 100 and 400 contain the digit 2?
20. The ratio of boys to girls in Mr. Brown's math class is 2:3. If there are 30 students in the class, how many more girls than boys are in the class?
21. If your average score on your first 6 math tests was 84 and your average score on your first 7 mathematics tests was 85, then your score on the 7th test was

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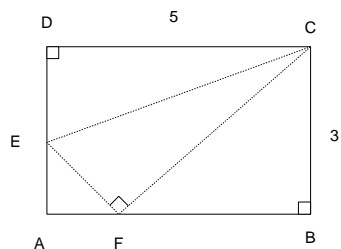
22. Nine copies of a certain pamphlet cost less than \$10.00 while ten copies of the same pamphlet (at the same price) cost more than \$11.00. What is the least number of cents for the cost of each pamphlet?
23. In a certain year, January had exactly four Tuesdays and four Saturdays. On what day did January 1 fall that year?
24. Assume every 7-digit whole number is a possible telephone number except those which begin with 0 or 1. What fraction of telephone numbers begin with 9 and end with 0?
25. King Middle School has 1200 students. Each student takes 5 classes a day. Each teacher teaches 4 classes. Each class has 30 students and 1 teacher. How many teachers are there at King Middle School?

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Section 3: Optional (100 points / 15 min)

1. Half of all students consist of $\frac{3}{5}$ of all the girls and $\frac{3}{7}$ of all the boys. If there are a total of 240 students, how many boys and girls are there?

2. On a piece of paper, ABCD is a rectangle. By folding along CE, D will land on F. Find the length of DE.



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Name: _____ Grade: _____ School: _____

Score: _____/800 + _____/100

Base points = 200 for all students

Total points = earned points + base points

1	(A) (B) (C) (D) (E)	16	
2	(A) (B) (C) (D) (E)	17	
3	(A) (B) (C) (D) (E)	18	
4	(A) (B) (C) (D) (E)	19	
5	(A) (B) (C) (D) (E)	20	
6	(A) (B) (C) (D) (E)	21	
7	(A) (B) (C) (D) (E)	22	
8	(A) (B) (C) (D) (E)	23	
9	(A) (B) (C) (D) (E)	24	
10	(A) (B) (C) (D) (E)	25	
11	(A) (B) (C) (D) (E)		
12	(A) (B) (C) (D) (E)		
13	(A) (B) (C) (D) (E)		
14	(A) (B) (C) (D) (E)		
15	(A) (B) (C) (D) (E)		