

**Contest Game**  
**"Math Kangaroo", 2002**  
**Grade 7-8**

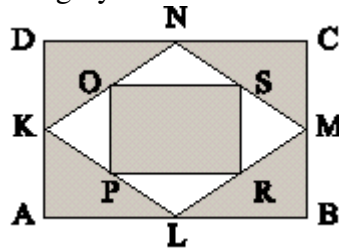
**Part A: Each question is worth 3 points**

1. Which of the following fractions has the largest value?  
A.  $\frac{7}{8}$       B.  $\frac{66}{77}$       C.  $\frac{555}{666}$       D.  $\frac{4444}{5555}$       E.  $\frac{33333}{44444}$
  
2. On July 1 in Newbury the sun will rise at 04:53 and set at 21:25. The local noon will be exactly halfway between these times. At what time will the local noon be in Newbury on July 1?  
A. 11:08      B. 12:39      C. 13:09      D. 16:32      E. 01:18
  
3. John needs exactly 2002 eggs as soon as possible. Each of his 23 hens lays an egg every day. How many days (including the first day) does John have to wait and how many eggs will be left after he takes his 2002 eggs?  
A. 87 days, no eggs left      B. 87 days, one egg left      C. 88 days, 20 eggs left  
D. 88 days, 21 eggs left      E. 88 days, 22 eggs left
  
4. In Canada part of the people can speak only English, part of them - only French, and part of them can speak both languages. A survey shows that 85% of the population speak English, 75% of the population speak French. How many per cent of the population can speak both languages?  
A. 50      B. 57      C. 25      D. 60      E. 40
  
5. In a children's game you call out all the numbers from 1 to 100. You clap every time you say either a multiple of 3 or a number ending by 3. How many times would you clap?  
A. 30      B. 33      C. 36      D. 39      E. 43
  
6. Three children ate 17 cookies altogether. Andrew ate more cookies than any other child. What is the smallest possible number of cookies that Andrew ate?  
A. 5      B. 9      C. 6      D. 8      E. 7
  
7. In some of the small squares of a  $2 \times 9$  grid there are coins. Each small square either contains a coin or has a common side with a similar square containing a coin. The number of coins in the grid must then be at least:  
A. 5      B. 6      C. 7      D. 8      E. 9
  
8. Christopher has drawn two different circles and three different straight lines and then has coloured the points of intersection of all pairs of geometrical objects. What is the maximum number of points of intersection he could possibly obtain?  
A. 18      B. 17      C. 16      D. 15      E. 14

**Part B: Each question is worth 4 points**

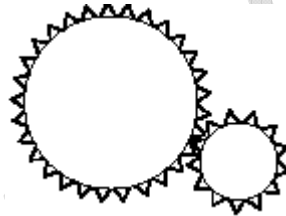
9. Consider the set of all four-digit numbers formed by the digits 1,2,3,4 without repetitions. What is the sum of all numbers from this set?  
A. 55550      B. 99990      C. 66660      D. 100000      E. 98760

10. On the figure, K, L, M, N are the midpoints of the sides of the rectangle ABCD. Similarly, O, P, R, S are the midpoints of the sides of the quadrilateral KLMN. What part of the rectangle ABCD is coloured grey?



- A.  $3/5$       B.  $5/6$       C.  $2/3$       D.  $3/4$       E.  $5/7$

11. In a certain machine you can find cogwheels as shown in the figure. The radius of the larger cogwheel is 3 times the radius of the smaller cogwheel. What will happen with the smaller cogwheel if the larger one is turned around once counter-clockwise?



- A. turn around once clockwise      B. turn around three times clockwise  
 C. turn around three times counter-clockwise      D. turn around 9 times clockwise  
 E. turn around 9 times counter-clockwise.

12. A box of apples costs 2 Euros, a box of pears costs 3 Euros, and a box of plums costs 4 Euros. If 8 fruit boxes cost 23 Euros together, what is the largest possible number of them that contain plums? (*Euro is the currency in the European countries that are members of the European Union*)

- A. 1      B. 2      C. 3      D. 4      E. 5

13. Four children bought a birthday present for their father. One of the children hid the present. Their mother asked them who had hidden the present. The four boys involved made the following statements about the offender:

Alfred: "It was not me!"      Benjamin: "It was not me!"      Christian: "It was Daniel!"

Daniel: "It was Benjamin!"

It turned out that exactly one of them did not tell the truth. Who was the offender?

- A. Alfred      B. Benjamin      C. Christian      D. Daniel      E. This cannot be determined

14. When freezing, water increases its volume by  $1/11$ . By what part of its volume will ice decrease when it melts and turns back into water?

- A.  $1/11$       B.  $1/10$       C.  $1/12$       D.  $1/13$       E.  $1/14$

15. The occupancy percentage of a hotel is 88% for the three summer months and 44% for the rest of the year's months. What is the average occupancy percentage for the whole year?

- A. 132%      B. 66%      C. 55%      D. 44%      E. another answer

16. In the same month, three Sundays have fallen on even-numbered days. What weekday was the 20<sup>th</sup> of that month?

- A. Monday    B. Tuesday    C. Wednesday    D. Thursday    E. Saturday

**Part C: Each question is worth 5 points**

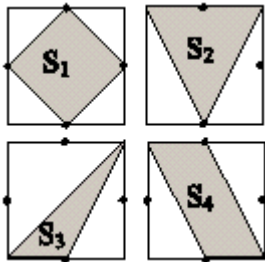
17. If  $a:b=9:4$ , and  $b:c=5:3$ , then  $(a-b) : (b-c)$  is equal to

- A. 7:12    B. 25:8    C. 4:1    D. 5:2    E. this cannot be determined

18. Five boys weighed themselves in pairs in all possible combinations. The measured weights were 90 kg, 92 kg, 93 kg, 94 kg, 95 kg, 96 kg, 97 kg, 98 kg, 100 kg, and 101 kg. What was the total weight of the five boys?

- A. 225 kg    B. 230 kg    C. 239 kg    D. 240 kg    E. 250 kg

19. There are four equal squares. The midpoints of some of their sides are marked, as shown on the picture. In each square, a certain area is coloured. These coloured areas are respectively  $S_1$ ,  $S_2$ ,  $S_3$  and  $S_4$ . Which of the following relations is true?

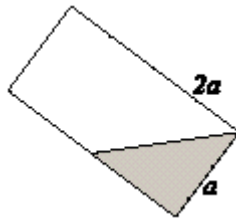


- A.  $S_3 < S_4 < S_1 = S_2$     B.  $S_3 < S_1 = S_2 = S_4$     C.  $S_3 < S_1 = S_4 < S_2$   
 D.  $S_3 < S_4 < S_1 < S_2$     E.  $S_4 < S_3 < S_1 < S_2$

20. It takes Mr. Been 90 seconds to walk up an escalator when it is not moving. It takes Mr. Been 60 seconds to go up, just standing when the same escalator is moving. How many seconds does it take Mr. Been to walk up the moving escalator?

- A. 36    B. 75    C. 45    D. 30    E. 50

21. A part of a cylindrical glass is filled with water and tilted by  $45^\circ$ , as shown in the picture. What percentage of the glass is filled?

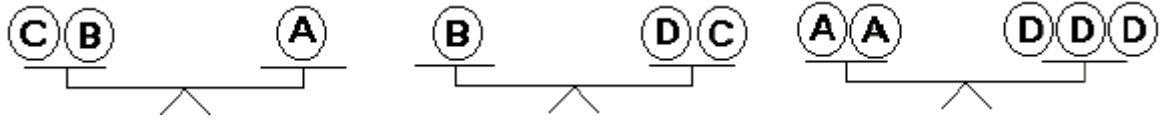


- A. less than 25%    B. 25%    C. 33%    D.  $33\frac{1}{3}\%$     E. more than  $33\frac{1}{3}\%$

22. Suppose a positive integer  $n$  is divisible by 21 and by 9. What is the smallest possible number of positive integers that divide  $n$ ?

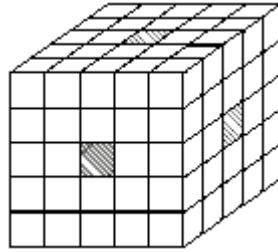
- A. 3    B. 4    C. 5    D. 6    E. 7

23. How many weights C can balance the weight B?



- A. 2                  B. 3                  C. 5                  D. 6                  E. 7

24. A cube with a side 5 units long is made of other cubes with a side 1 unit long. Take out three rows of small cubes (as shown in the picture) and immerse the obtained solid in paint. How many small cubes have only one face painted?



- A. 30                  B. 26                  C. 40                  D. 48                  E. 24

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**March 23, 2002**

**Answers**  
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<b>1</b>	<b><u>A</u> B C D E</b>	<b>9</b>	<b>A B <u>C</u> D E</b>	<b>17</b>	<b>A <u>B</u> C D E</b>
<b>2</b>	<b>A B <u>C</u> D E</b>	<b>10</b>	<b>A B C <u>D</u> E</b>	<b>18</b>	<b>A B <u>C</u> D E</b>
<b>3</b>	<b>A B C D <u>E</u></b>	<b>11</b>	<b>A <u>B</u> C D E</b>	<b>19</b>	<b>A <u>B</u> C D E</b>
<b>4</b>	<b>A B C <u>D</u> E</b>	<b>12</b>	<b>A B <u>C</u> D E</b>	<b>20</b>	<b><u>A</u> B C D E</b>
<b>5</b>	<b>A B C <u>D</u> E</b>	<b>13</b>	<b>A B C <u>D</u> E</b>	<b>21</b>	<b>A <u>B</u> C D E</b>
<b>6</b>	<b>A B C D <u>E</u></b>	<b>14</b>	<b>A B <u>C</u> D E</b>	<b>22</b>	<b>A B C <u>D</u> E</b>
<b>7</b>	<b><u>A</u> B C D E</b>	<b>15</b>	<b>A B <u>C</u> D E</b>	<b>23</b>	<b>A B <u>C</u> D E</b>
<b>8</b>	<b>A <b>B</b> C D E</b>	<b>16</b>	<b>A B C <b>D</b> E</b>	<b>24</b>	<b>A B C D <u>E</u></b>