

# European Contest-Game Math Kangaroo

Online Training  
March 19, 2011

**Grade 3-4**

03/19/11

Saturday, March 19, 2011

## General Points and Strategy

The Kangaroo math contest has 24 multiple-choice questions. You will have 60 minutes to answer them all.

They are divided into three parts of 8 questions each:

**Part A** (*easy*) - correct answer is worth 3 points

**Part B** (*medium*) - correct answer is worth 4 points

**Part C** (*hard*) - correct answer is worth 5 points

Questions left blank are worth 0 points.

Wrong answers carry a penalty of -1 point.

Calculators are **not permitted**.

## General Points and Strategy

The Kangaroo math contest consists of 24 multiple-choice questions to be answered in 60 minutes.

That means you only have two and a half minutes for every question!

If you get stuck on a question, skip it, do the other ones and come back to it when you're sure you have time to try again.

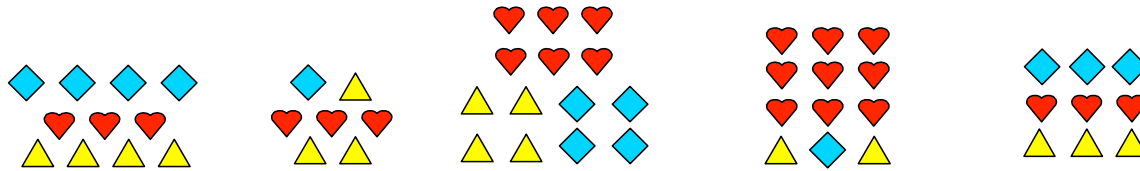
Very few students finish the entire contest in the time allotted and answer every question correctly.

Do not be discouraged if you find you can't do some questions.

Remember, if you don't know the answer, don't guess! It's better to leave the answer blank than to risk losing 1 point if you guessed wrong.

Part A: Each correct answer is worth 3 points.

1) In one of the following pictures exactly three quarters of all objects are hearts. Which one is it?



A)

B)

C)

D)

E)

*A has 3 hearts and 11 objects which is  $3/11$ , not  $3/4$*

*B has 3 hearts and 7 objects which is  $3/7$ , not  $3/4$*

*C has 6 hearts and 14 objects which is  $6/14 = 3/7$ , not  $3/4$*

*D has 9 hearts and 12 objects, which is  $9/12 = 3/4$  :-)*

**Answer: D)**

Part A: Each correct answer is worth 3 points.

2) What is the sum  $2001 + 2002 + 2003 + 2004 + 2005$  ?

A) 1015    B) 5010    C) 10150    D) 11005    E) 10015

*The long way:*

$2001 + 2002 + 2003 + 2004 + 2005 \dots$

*The short way:*

$(2000 + 1) + (2000 + 2) + (2000 + 3) + (2000 + 4) + (2000 + 5)$

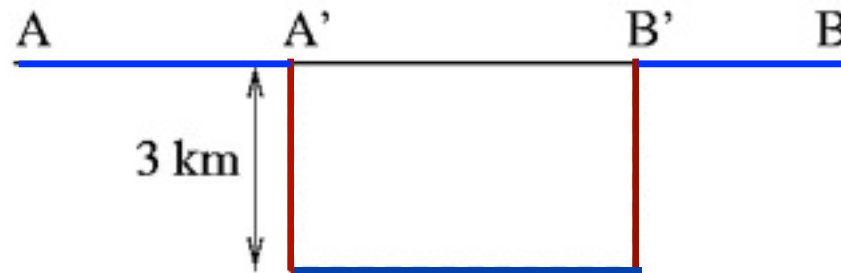
$= (2000 \times 5) + 1 + 2 + 3 + 4 + 5$

$= 10015$

**Answer: E)**

Part A: Each correct answer is worth 3 points.

- 3) At the picture below you can see a road from town A to town B (a solid line), and a detour of a renovated interval A'B', marked as a dashed line. How many km further does one have to travel using the detour?



- A) 3 km    B) 5 km    C) 6 km    D) 10 km  
E) This is impossible to calculate

*The detour involves driving 3 km away from the road, driving alongside it, then driving 3 km back to it.*

*But this stretch is exactly the same as what we would've driven.*

**Answer: C)  $3 + 3 = 6$  km**

Part A: Each correct answer is worth 3 points.

4) Jerome was 4 years old when his sister was born. Today he celebrates his 9th birthday. What is the age difference between him and his sister?

- A) 4 years
- B) 5 years
- C) 9 years
- D) 13 years
- E) 14 years

*The difference between them was 4 years when his sister was born.*

*Does the difference between ages change?*

*No, the difference will always be 4 years.*

**Answer: A)**

Part A: Each correct answer is worth 3 points.

5) In the picture,  $AC=10\text{m}$ ,  $BD=15\text{m}$ ,  $AD=22\text{m}$ . Find  $BC$ .

- A) 1m
- B) 2m
- C) 3m
- D) 4m
- E) 5m



$$AC + CD = AD$$

$$10\text{m} + CD = 22\text{m}$$

$$CD = 22\text{m} - 10\text{m}$$

$$CD = 12\text{m}$$

$$BD - CD = BC$$

$$15\text{m} - 12\text{m} = 3\text{m}$$

Answer: C)



Part B: Each correct answer is worth 4 points.

6) Hedgehog Mark complained to his friends: *"If I had picked up twice as many apples as I really did, I would have 24 apples more than I have now."* How many apples did Mark pick up?

A) 48

B) 24

C) 42

D) 12

E) 36



*Twice as many apples is the same as 24 more apples.*

*Mark wishes he had picked up 24 more apples, which is the same as the number of apples he had.*

**Answer: B)**

Part B: Each correct answer is worth 4 points.

7) Gabriella brings to Joseph a basket with apples and oranges. Joseph has eaten a half of all apples and one third of all oranges. Which part of the fruits remained in the basket?

- A) half of all fruits
- B) more than half of all fruits
- C) less than half of all fruits
- D) one third of all fruits
- E) less than a third of all fruits

*If Joseph had eaten half of the apples and half of the oranges, then half of all fruits would remain.*

*However, he ate one third of the oranges.*

*Is one third less than half?*

*It is,  $1/3$  is less than  $1/2$ .*

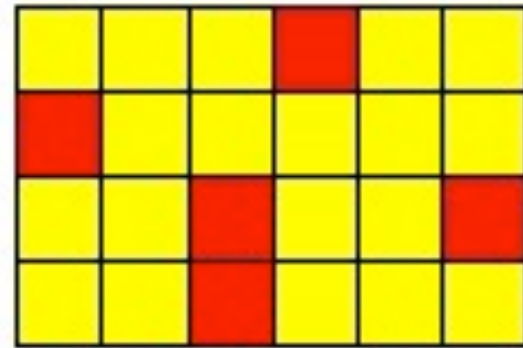
*So how many fruits are left?*

**Answer: B)**

Part B: Each correct answer is worth 4 points.

- 8) How many yellow squares must you paint red so that the number of red squares is exactly half of the number of yellow squares?

- A) 2    B) 3    C) 4    D) 6  
E) this is impossible



*Currently, there are 5 red squares.*

*Since the squares can either be red or yellow, for the red squares to be exactly half of the yellow ones, they have to be a third of the total number of squares.*

*In other words, we want a third of 24 squares to be red.*

*$1/3 \times 24 = 8$ . We have 5 at the moment, we should paint 3 more.*

**Answer: B)**

Part B: Each correct answer is worth 4 points.

- 9) Chris constructed the brick on the picture using red and blue cubes of the same size. The outside of the brick is completely red, but all cubes used inside are blue. How many blue cubes did Chris use?

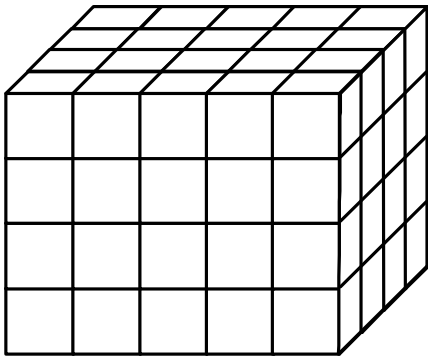
A) 12

B) 24

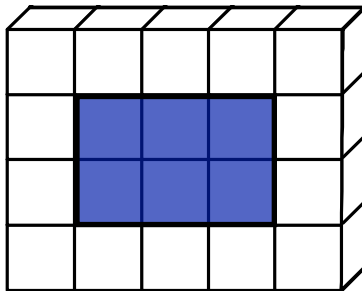
C) 36

D) 40

E) 48



*The front layer is all red, as is the back one. Let's look at the two middle layers. Each of them has red cubes all around the outside and blue ones in the middle.*



*Each of the middle layers has six blue cubes in the middle, giving a total of 12 cubes.*

**Answer: A)**

Part B: Each correct answer is worth 4 points.

10) Betty likes calculating the sum of the digits that she sees on her digital clock (for instance, if the clock shows 21:17, then Betty gets 11). What is the biggest sum she can get if the clock is a 24-hour clock?

- A) 24
- B) 36
- C) 19
- D) 25
- E) another answer

**Answer: A)**

*The biggest sum we can get from minutes is obtained by the biggest digits: 5 and 9.*

*The biggest number we can have as the hour is 23.*

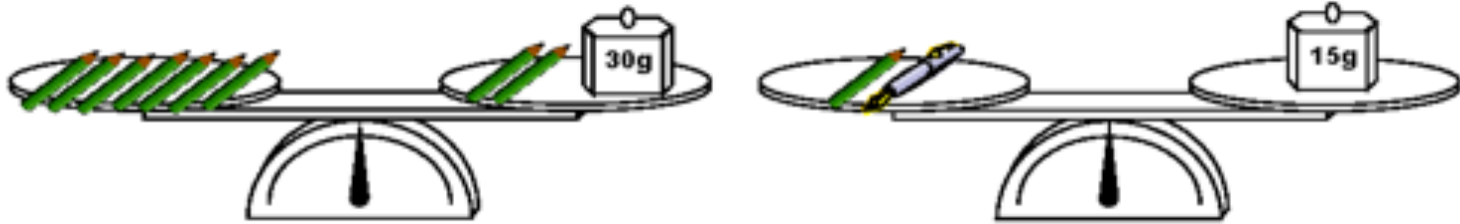
*BUT! That's not the number with the biggest sum of digits.*

*That number is 19.*

*So the total maximum sum of digits is  $1 + 9 + 5 + 9 = 24$ .*

Part C: Each correct answer is worth 5 points.

- 11) The picture below shows 9 pencils and a weight of 30 g on a balance scale. The picture on the right shows one of the same pencils, a pen, and a weight of 15 g. Both scales are balanced. How many grams does the pen weight?



- A) 6 g   B) 7 g   C) 8 g   D) 9 g   E) 10 g

*On the first scale, taking two pencils from each side will not change the balance, leaving five pencils on one side and 30 grams on the other.*

*That means that each pencil weighs  $30 / 5 = 6$  grams.*

*Then, a 6-gram pencil and a pen weigh 15 grams, so a pen weighs  $15 - 6 = 9$  grams.*

**Answer: D)**

Part C: Each correct answer is worth 5 points.

12) In a class there are 29 children. 12 children have a sister and 18 children have a brother. Tina, Bert, and Anne have no brother and no sister. How many children in that class have both a brother and a sister?

- A) no one     *How many children have a brother or a sister if 3 children don't have any?*
- B) 1
- C) 3     *There are 26 children with a brother or a sister.*
- D) 4
- E) 6     *If none of them had both, there would be  $12 + 18 = 30$  children. However, we only have 26, which means 4 children have to be in both groups, i.e. 4 children have both a brother and a sister.*

**Answer: D)**

Part C: Each correct answer is worth 5 points.

- 13) There are five houses on Colour Street : a blue, a red, a yellow, a pink, and a green one. The houses are numbered from 1 to 5 (see the picture).



Determine the color of house #3 using the following clues

- The numbers of the blue and yellow houses are even.
- The red house is next to the blue house only.
- The blue house is between the green and red houses.

A) Blue B) Red C) Yellow D) Pink E) Green

Answer: E)

*The blue house is either #2 or #4.*

*The red house is only next to the blue, so it's on the end (#1 or #5)*

*The green house is on the other side of the red house with respect to the blue house, making it #3 in either case.*



Part C: Each correct answer is worth 5 points.

- 14) Four numbers are placed in the small squares in the table below:


If the sum of the numbers of the first row is 3, the sum of the numbers of the second row is 8 and the sum of the numbers of the first column is 4, what is the sum of the numbers in the second column?

- A) 4    B) 6    C) 7    D) 8    E) 11

*The sum in the first row is 3*

*The sum in the second row is 8*

*So, the sum in the entire table is  $3 + 8 = 11$*

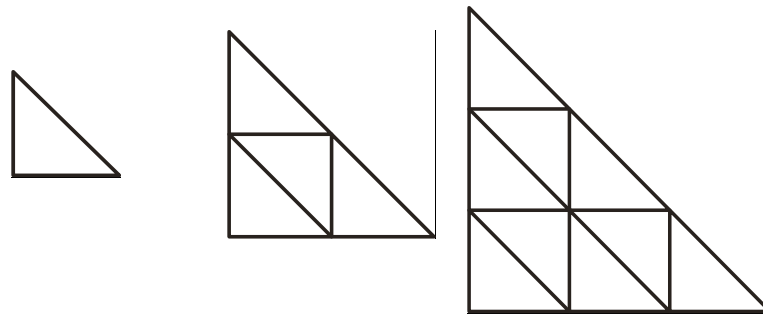
*Out of those 11, we know that 4 belong in the first column.*

*So, the sum in the second column is  $11 - 4 = 7$*

**Answer: C)**

Part C: Each correct answer is worth 5 points.

- 15) The first three figures of a pattern are constructed from triangles, as shown:



There is one triangle on the first figure, 4 triangles on the second figure, and 9 triangles on the third figure. If the pattern is extended with several more figures, how many triangles will be there on the fifth figure?

- A) 15    B) 20    C) 25    D) 30    E) 50

*Considering diagonal rows, the first triangle has 1, the second  $1 + 3 = 4$ , the third  $1 + 3 + 5 = 9$ .*

*If the pattern is followed, the fourth will be  $1 + 3 + 5 + 7 = 16$ .*

*The fifth will be  $1 + 3 + 5 + 7 + 9 = 25$ .*

**Answer: C)**