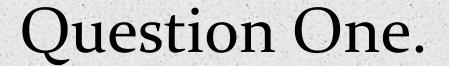# Gambling Round

Berkeley Math Tournament – Fall 2012

Question One.

Combinatorics

Question One.

A bag holds 6 coins. Three have tails on both sides, two have heads on both sides, and one has heads on one side and tails on the other. If you pick a coin at random and notice the only side you can see is heads, what is the probability that the other side is also a head?

Question One.

4/5

Question Two.

Algebra

Question Two.

A class of 45 students contains students from 3 different majors. 15 students are EECS majors, 20 are MCB majors, and 20 are Math majors. 3 double major in EECS and Math, 5 double major in Math and MCB, and 4 double major in MCB and EECS. How many of them are triple majors in EECS, Math and MCB?

Question Two.

2

Question Three.

Meta

Question Three.

Pick an integer between 1 and 100 (inclusive).
You _win_ if _at least one other person_ picks your number.
You _lose_ if _nobody else_ picks your number.

Question Three.

?

Question Four.

Logic

Question Four.
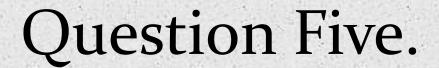
Consider the following statements made by five different people.
a. Person b and Person c are lying!
b. Person c and Person d are lying!
c. Person d and Person e are lying!
d. I am telling the truth!
e. Person a and Person b are not both lying!
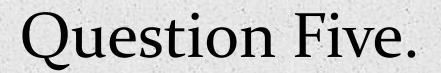What is the maximum possible number of statements that could be true?
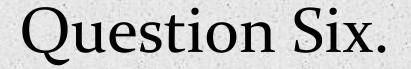
Question Four.

3

Question Five.

Geometry

Question Five.

A line *l* is drawn through a square such that it splits the square into two regions, each with area 32. If the line intersects the square 1 unit from one vertex, find the length of the portion of *l* contained entirely within the square.

Question Five.

10

Question Six.

Number Theory

Question Six.

November 3rd, 2012 is a Saturday. What day of the week is November 3rd, 2016?

Question Six.

Thursday

Question Seven.
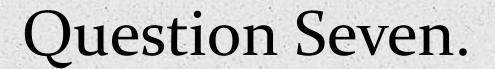
Meta

Question Seven.

Guess an integer between 1 and 100 (inclusive) that is less than the average of all submitted numbers!
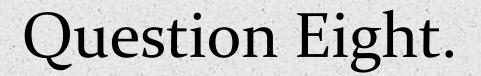
Question Seven.

?

Question Eight.

Geometry

Question Eight.

A rectangle has vertices with coordinates (-1,3), (9,3), (9,19) and (-1,19). What is the probability that a point randomly chosen inside the rectangle will be to the right of the line y = 2x + 1?

Question Eight.

2/5

Question Nine.

Combinatorics

Question Nine.

Jim has 3 quarters, 4 nickels, 5 dimes, and 6 pennies. In how many ways can he make 97 cents?

Question Nine.

6

Question Ten.

Algebra

Question Ten.

In the world of Samdep, the order of operations is the reverse of what it is here; that is, addition and subtraction come before multiplication and division, and exponents are evaluated last. Then, if 3 + 3 / 6 - 4 * 3 ^ 2 = x * 4 + 5, find x.

Question Ten.

9

Question Eleven.

Number Theory

Question Eleven.

Including 0 and the one-digit integers,
what is the 42nd palindrome?

Question Eleven.

323

Question Twelve.

Geometry

Question Twelve.

Circle O_2 of radius 2 is internally tangent to circle O_1 of radius 9. A radius of circle O_1 is drawn tangent to circle O_2, and the radius of circle O_2 perpendicular to the tangent is extended until it intersects circle O_1 at P. Find the distance from P to the center of circle O_2. Denote this by C.

Question Twelve.

8

Question Thirteen.

Logic

Question Thirteen.

One of the following people is lying. Who?
1. 5 is lying.
2. If 3 is telling the truth, then so am I.
3. 4 and 5 are not both telling the truth.
4. I am telling the truth.
5. 1 is lying.

Question Thirteen.

5

Question Fourteen.

Combinatorics

Question Fourteen.

9 students in a math class are divided into groups of 3 students each. What is the probability that Edgar and Edward (two of the students) are in the same group?
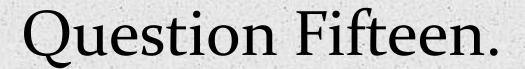
Question Fourteen.

1/4

Question Fifteen.

Geometry

Question Fifteen.

What is the surface area of a cube inscribed in a sphere with surface area 8π?

Question Fifteen.

16

Last Question !!!

Question Sixteen.

Number Theory

Question Sixteen.

In simplest form, what is
(36! + 37!)/(38! + 39!)?

Question Sixteen.

1/1480