



Grade 6 Math Circles
November 28/29
Math Jeopardy

Introduction

Questions will vary in difficulty with \$100 questions tending to be the easiest, and \$500 questions tending to be the hardest. Do your best, good luck and have fun!

Sequence of Probable Events

\$100 What is the probability of rolling a prime number on a 6-sided die?

\$200 You have 4 shirts, 5 pairs of pants and 3 pairs of shoes to choose from. How many outfits can you make?

\$300 What is the next term in the following sequence? $\{0,1,1,2,3,5,8,13,21,34\}$

\$400 What type of sequence is this? What is the 11th term?

$$\{3,9,15,21\}$$

\$500 You are hired by your friend to help build a shed for 5 weeks. You are paid \$11 the first week. Every week after you are paid twice as much as the week before. How much money will you make in total?

The Powers of Algebra

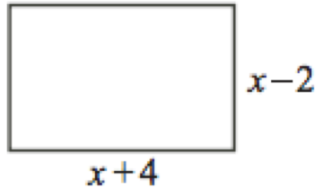
\$100 Addition is repeated addition. Exponentiation is repeated _____?

\$200 Solve for the x in the following equation: $15 + 2x = 7x$

\$400 Solve for x in the following equation:

$$x + 3 \times 4 + x = (40 - 6) \div 2$$

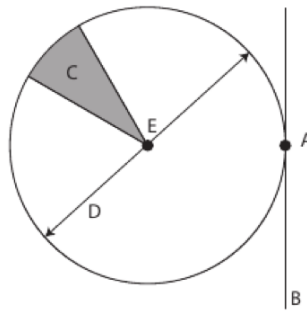
\$500 In the diagram, the perimeter of the rectangle is 56 units. What is its area?



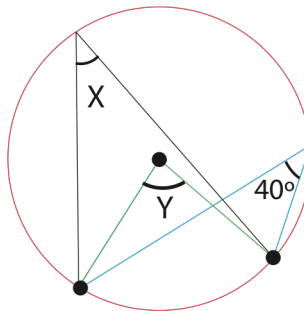
Running in Circles

\$100 What is the result of dividing the circumference of a circle by its radius?

\$200 Correctly Identify each part of the circle:

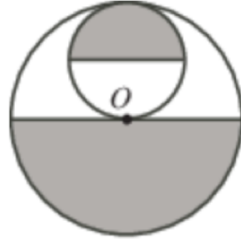


\$300 Using the diagram find angles X and Y :



\$400 The circumference of a circle is 10π . What is its area?

\$500 In the diagram, each circle is divided into two equal areas and O is the centre of the larger circle. The radius of the larger circle is 8. What is the total area of the shaded regions?



A Number of Secrets

\$100 What sets of numbers do the following numbers belong to?

$$7, \sqrt{2}$$

\$200 How many prime numbers are there between 10 and 30?

\$300 Decode this message that has been encrypted with an Atbash Cipher.

Gsv ovzevh ziv uzoormt

\$400 Decrypt the following message with Pigpen Cipher:

└┐┌┐> >┐┌┐┐┐┐

A	B	C	J	K	L
D	E	F	M	N	O
G	H	I	P	Q	R

S	U	W	Y
T	V	X	Z

\$500 Police are attempting to identify the name of a doctor. They have found a document with what they believe to be the doctors name on it but it has been encrypted with a Caesar Shift. The encryption of the doctors name looks as follows:

Ym. Wdgg Rdggdvhn

What is the shift number of the Caesar Cipher? What is the name of the Doctor?

Logically Puzzling

\$100 Two fathers took their sons fishing. Each person caught one fish, but when they returned to camp, there were only 3 fish. How could this be?

\$200 It is noon and John wants to go get lunch at Subway. But, there is a terrible snowstorm outside and it is impossible for him to drive there. However, the forecast says that the snow will turn into hail and it will hail the rest of the day. How can you determine whether the sun will be shining 36 hours from now?

\$300 How many people would we need in this room to guarantee that two people have the same birthday?

\$400 Given the equivalences, what's the missing number?

$$12 = 6$$

$$6 = 3$$

$$5 = _$$

\$500 Use exactly four 4s (and no other numbers) to make the numbers 7 and 3. You can use any combination of operations/tools.

For example: $\times \div + - \sqrt{\quad}$

Gauss Contest

\$100 Which of the following numbers lies between 3 and 4 on a number line?

(A) $\frac{5}{2}$ (B) $\frac{11}{4}$ (C) $\frac{11}{5}$ (D) $\frac{13}{4}$ (E) $\frac{13}{5}$

(Source: 2018 Gauss (Grade 7), #6)

\$200 Chris and Pat are playing catch. Standing 1 m apart, Pat first throws the ball to Chris and then Chris throws the ball back to Pat. Next, standing 2 m apart, Pat throws to Chris and Chris throws back to Pat. After each pair of throws, Chris moves 1 m farther away from Pat. They stop playing when one of them misses the ball. If the game ends when the 29th throw is missed, how far apart are they standing and who misses catching the ball? (Source: 2005 Gauss (Grade 7), #19)

\$300 Which of the following is closest to one million seconds?

(A) 1 day (B) 10 days (C) 100 days (D) 1 year (E) 10 years

(Source: 2006 Gauss (Grade 7), #19)

\$400 An *arithmetic sequence* is a sequence in which each term after the first is obtained by adding a constant to the previous term. For example, 2, 4, 6, 8 and 1, 4, 7, 10 are arithmetic sequences.

In the grid shown, the numbers in each row must form an arithmetic sequence and the numbers in each column must form an arithmetic sequence. The value of x is

- (A) 37 (B) 28 (C) 36 (D) 43.75 (E) 46

1			
4			25
7			x
10		36	

(Source: 2013 Gauss (Grade 7), #22)

\$500 The operation \triangle is defined so that $a\triangle b = a \times b + a + b$. For example, $2 \triangle 5 = 2 \times 5 + 2 + 5 = 17$. If $p \triangle 3 = 39$, the value of p is what?

- (A) 13 (B) 12 (C) 9 (D) 10.5 (E) 18

(Source: 2015 Gauss (Grade 8), #18)

Final Jeopardy

\$1500 Lara ate $\frac{1}{4}$ of a pie and Ryan ate $\frac{3}{10}$ of the same pie. The next day Cassie ate $\frac{2}{3}$ of the pie that was left. What fraction of the original pie was not eaten?