



Grade 6 Math Circles
April 4, 2012
Jeopardy - Solutions

Arithmetic Tricks:

100 points: Multiply the following: $64 \times 52 = 3328$

200 points: Multiply the following: $31472 \times 11 = 346192$

300 points: Is 157696 divisible by 11?

Yes, 157696 is divisible by 11 since the alternating sum of the digits, $1 - 5 + 7 - 6 + 9 - 6 = 0$, equals 0 which is divisible by 11.

400 points: For what value(s) of z is $62z$ divisible by 8?

Since 6 is an even number, we need to find a value of z such that $2z$ is divisible by 8. The only possible value for z is 4.

500 points: For what values of p and r is $5p09r$ divisible by 3 and 4?

In order for $5p09r$ to be divisible by 4, the last 2 digits need to be divisible by 4. So the possible values for r are 2 and 6.

If $r = 2$ then $5p092$ will be divisible by 3 when p is equal to 2, 5, or 8 since the sum of the digits will be divisible by 3.

If $r = 6$ then $5p096$ will be divisible by 3 when p is equal to 1, 4, or 7 since the sum of the digits will be divisible by 3.

Math Puzzles:

100 points: What is a logic puzzle? Give 3 examples of different kinds of logic puzzles.

A logic puzzle is a type of mathematical problem that uses reasoning to determine the answer.

Three examples of logic puzzles are Magic Squares, Sudokus, and logic word problems.

200 points: Jackson bought 7 t-shirts for \$9.95 each. The cashier charged an additional \$13.07 in sales tax. When he left the store, he had only \$7.28 in his pocket. How much money did he start with?

Jackson spent a total of $7 \times \$9.95 + \$13.07 = \$69.65 + \$13.07 = \$82.72$

Since he had a total of \$7.28 left, he started with $\$7.28 + \$82.72 = \$90.00$

300 points: The statement “If they did not go to the-EX, then they went to Wonderland” is the true statement.

- 400 points:** The magic square below contains each of the integers from 10 to 25. What is the magic constant? Fill in the rest of the magic square.
The magic constant is 70. The solution to the magic square is:

10	11	24	25
21	23	12	14
22	16	19	13
17	20	15	18

- 500 points:** Four children: Heather, Laura, Grace, and Natalia went to a carnival. At the end of the day, they took a picture together, each holding a different coloured balloon (one was orange). From the following clues, determine where each child stood in the picture, and which colour balloon they were holding.
- Laura stood two to the left of Natalia, who was holding a yellow balloon.
 - The two girls on the ends were holding a blue balloon and a red balloon in some order.
 - Heather was not standing on the far right side of the picture.
 - Grace did not have a blue balloon

The order from left to right is Laura (blue balloon), Heather (orange balloon), Natalia (yellow balloon), and Grace (red balloon).

Number Theory:

- 100 points:** Determine the GCD and LCM of 15 and 24.
 $\text{GCD}(15,24)=3$
 $\text{LCM}(15,24)=120$
- 200 points:** Determine the GCD and LCM of 48 and 52.
 $\text{GCD}(48,52)=4$
 $\text{LCM}(48,52)=624$
- 300 points:** Determine the GCD and LCM of 15, 24, and 42.
 $\text{GCD}(15,24,42)=3$
 $\text{LCM}(15,24,42)=840$
- 400 points:** A florist has 16 red flowers, and 24 white flowers. What is the largest number of identical bouquets that she can create without having any left over flowers? How many red and white flowers will be in each bouquet?
 $\text{GCD}(16,24)=8$
 Therefore, the florist can create 8 identical bouquets with 2 red flowers and 3 white flowers in each.

500 points: A science teacher wants to make science kits full of supplies. Lab coats come 4 to a box, test tubes come 27 to a box, and safety glasses 12 to a box. What is the least number of kits she can make if she wants each kit to be identical and have no supplies left over? How many boxes of each type of supplies should she buy?

$$\text{LCM}(4,12,27)=108$$

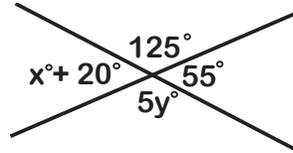
She can make 108 identical kits without having any supplies left over. She should buy 27 boxes of lab coats, 4 boxes of test tubes and 9 boxes of safety glasses.

Geometry:

100 points: State each of the properties for complementary angles, supplementary angles, opposite angles.

Complementary angles sum to 90° , supplementary angles sum to 180° , and opposite angles are equal.

200 points: Determine the values of x and y .

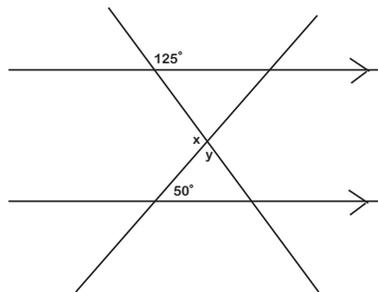


$$x = 35^\circ \text{ and } y = 25^\circ$$

300 points: A dodecagon is a 12 sided polygon. Determine the sum of interior angles of a regular dodecagon and the measure of each interior angle.

The formula for determining the sum of interior angles of a polygon is $(n - 2) \times 180^\circ$. The sum of interior angles for a regular dodecagon is 1800° . Since each interior angle is of the same size, the measure of each interior angle is 150° .

400 points: Determine the values of x and y in the diagram below.



$$x = 105^\circ \text{ and } y = 75^\circ$$

