UNIVERSITY OF
WATERLOO

University of Waterloo
Faculty of Mathematics
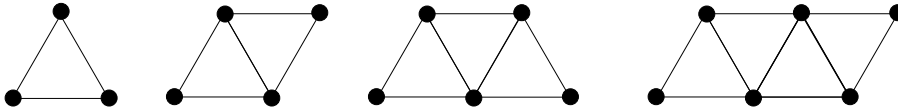
Centre for Education in
Mathematics and Computing

Grade 7/8 Math Circles
Winter 2011
Jeopardy

Patterns

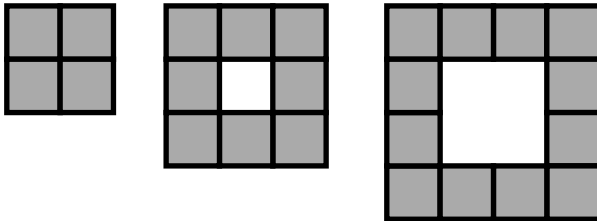100. What is the next term in the sequence: 1, 7, 13, ___?

200. How many gumballs and tootpicks will be in the next picture, continuing the pattern.

300. What are the next two terms in the sequence: 1, 8, 27, ___, ___?

400. What are the next two term of: 1, 3, 2, 6, 5, ___, ___?

500. How many tiles are in the next two pictures?

Mystery

100. Jane buys a camera which costs \$200.00 without tax. If she pays 15% tax on this purchase, how much tax does she pay?

200. Kayla went to the fair with \$100. She spent $\frac{1}{4}$ of her \$100 on rides and $\frac{1}{10}$ of her \$100 on food. How much money did she spend?

300. Cayli must choose one activity from each of the following groups: art, sports, and music. If there are 2 art choices, 3 sport choices, and 4 music choices, how many possible combinations of art, sports, and music choices can Cayli make?

400. In the diagram, AB and CD are straight lines. What is the value of x?
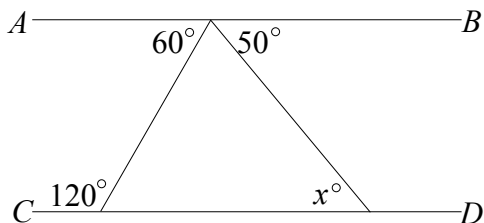
500. If Jeff picks one letter randomly from the alphabet, what is the probability that the letter is in the word 'probability'?

Algebra

100. Lorri took a 240 km trip to Waterloo. On her way there, her average speed was 120 km/h. She was stopped for speeding, so on her way home her average speed was 80 km/h. What was her average speed, in km/h, for the entire round-trip?

200. The number of faces (F), vertices (V) and edges (E) of a polyhedron are related by the equation $F + V - E = 2$. If a polyhedron has 6 faces and 8 vertices, how many edges does it have?

300. A temperature measured in degrees Celsius (C) can be converted to degrees Fahrenheit (F) using the formula $F = \frac{9}{5}C + 32$. If the temperature is 10 degrees Celsius, what is the temperature in degrees Fahrenheit?

400. If the mean (average) of five consecutive integers is 21, what is the smallest of the five integers?

500. The values of r, s, t and u are 2, 3, 4 and 5, but not necessarily in that order. What is the largest possible value of $r \times s + u \times r + t \times r$?

Logic

100. Mary's mom has four children. The first child is called April. The second May. The third June. What is the name of the fourth child?

200. Which of the following statements is true:

A. The number of false statements here is one.

B. The number of false statements here is two.

C. The number of false statements here is three.

D. The number of false statements here is four.

300. A 4×4 square grid can be entirely covered by three non-overlapping pieces made from 1×1 squares. If the first two pieces are and , what is the shape of the third missing piece?

400. You can paddle your conoe 7 km/h through any calm lake. The stream flows at 3 km/h. The moment you start to paddle up stream a fisherman looses one of his bobbers in the water 14 km up stream of you. How many hours does it take for you and the bobber to meet?

500. Abby has 23 coins. The coins have a total value of $4.55. If she has only quarters (worth 25 cents each) and nickles (worth 5 cents each), how many quarters does she have?

Gauss

100. The numbers 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 are written on separate cards and placed face down on a table. A card is chosen at random and flipped over. What is the probability that the number on this card is a prime number?

200. If four different numbers are chosen from 5, 6, 7, 8, 9, what is the smallest possible sum of two 2-digit numbers?

300. In the diagram, RSP is a straight line and $\angle QSP = 80°$. What is the measure of $\angle PQR$? Ans. 90°
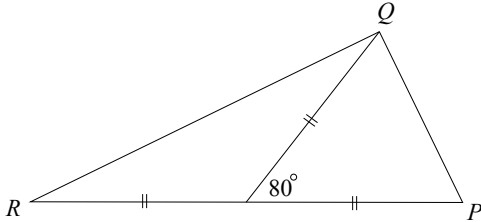
400. Distinct points are placed on a circle. Each pair of points is joined with a line segment. If 8 distinct points are placed on a circle, how many line segments would there be?

500. Two circles each have radius 10 cm. They overlap so that each contains exactly 25% of the other's circumference, as shown. What is the approximate area of the shaded region?