



The Mandelbrot Competition

Round Two Test

Time Limit:
40 minutes

Name: _____

<p>1. Rohan and Arjun have the same number of colored beads. Rohan trades three of his gold beads for ten of Arjun's orange beads, at which point he has twice as many beads as Arjun. How many beads does Rohan now have?</p>		(1)
<p>2. Among all fractions whose numerator and denominator are both one-digit positive integers, find the one that comes closest in value to 30%.</p>		(1)
<p>3. Suppose that in the diagram shown at right we have $m\angle ABC = 20^\circ$ and $m\angle ACB = 12^\circ$. Compute the acute angle of intersection formed by the angle bisector of angle $\angle DAB$ and line BC.</p>		(2)
<p>4. Write five distinct digits (including the 2) into the circles pictured so that the sum of any two adjacent numbers is a multiple of the next number, when moving around counterclockwise. Which digit appears after the 2?</p>		(2)
<p>5. Each of the six points in this network is connected to its neighbors as well as to the point directly across from it. In how many ways can one color each point either green, red, or brown so that connected points always have different colors?</p>		(2)
<p>6. Sophie has unit squares and isosceles triangles with two sides of length 1 and a vertex angle measuring $\frac{\pi}{13}$ radians. By arranging them in some order (in the manner shown) she creates a loop whose outer perimeter is a 36-sided polygon. How many squares does she use?</p>		(3)
<p>7. Christine numbers ten index cards from 1 to 10, then chooses three cards at random and orders them from smallest to largest. What is the probability that the middle number is closer to the larger number than the smaller one?</p>		(3)

SCORE: