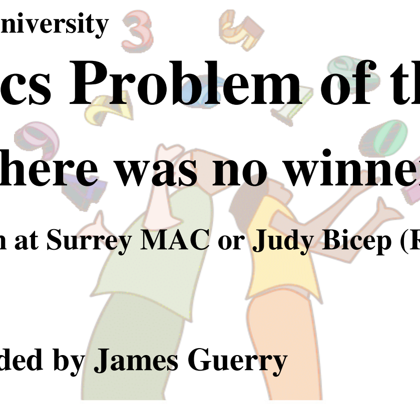
Kwantlen Polytechnic University

Mathematics Problem of the Week 11



There was no winner this week.

Contact Tariq Nuruddin at Surrey MAC or Judy Bicep (Richmond,3335) for your prize or email MathProblem@kpu.ca**.**

Partial Solution provided by James Guerry

Consider the sum of the first n terms of the sequence 120, 125, 130, 135, … :

$$S_n = \frac{n}{2}\left(120 + (115 + 5n)\right)$$

$$S_n = \frac{5}{2}n^2 + \frac{235}{2}n$$

Consider the sum of the interior angles of a polygon with n sides:

$$S_n = 180(n - 2)$$

$$S_n = 180n - 360$$

Therefore:

$$\frac{5}{2}n^2 + \frac{235}{2}n = 180n - 360$$

$$\frac{5}{2}n^2 + \frac{235}{2}n - 180n + 360 = 0$$

$$\frac{5}{2}n^2 - \frac{125}{2}n + \frac{720}{2} = 0$$

$$n^2 - 25n + 144 = 0$$

$$(n - 9)(n - 16) = 0$$

$$n = 9, 16$$

Therefore, the other polygon must be a 16-gon with angles 120˚, 125˚, 130˚, … , 195˚.

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However, one side will be a straight line due to a 180^0 angle. So the other polygon will be a 15-gon or a pentadecagon.