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SYNOPSIS

129 Skoliad: No. 101 *Robert Bilinski*

- 6th Annual CNU Regional High School Mathematics Contest (2005)
- 6^{ième} Concours CNU Régional de Mathématiques (2005)
- official solutions to the 22nd W.J. Blundon Contest

135 Mathematical Mayhem *Jeff Hooper*

135 Mayhem Problems: M288–M293

138 Mayhem Solutions: M238–M243

143 Problem of the Month *Ian VanderBurgh*

146 Pólya's Paragon: The Pigeonhole Principle *Jeff Hooper*

149 The Olympiad Corner: No. 261 *R.E. Woodrow*

Featuring the XX Olimpiadi Italiane Della Matematica 2004; 17th Irish Mathematical Olympiad 2004 (first and second papers); New Zealand Mathematical Olympiad (IMO Squad Selection Problems 2004); and readers' solutions to some of the problems from

- the 10th Grade Romanian Mathematical Olympiad;
- the 15th Korean Mathematical Olympiad;
- the X National Mathematical Olympiad of Turkey;
- the 2003 Vietnamese Mathematical Olympiad;
- the Japan Mathematical Olympiad 2003;
- the Hungarian Mathematical Olympiad 2002–2003 (first and final rounds);
- the 2002 Kürschák Competition.

165 Book Review *John Grant McLoughlin*

165 *Mathematical Journeys*

by Peter D. Schumer

Reviewed by Georg Gunther

166 Butterfly Metamorphosis

by *Andy Liu*

The setting of the Butterfly Theorem involves three concurrent chords in a circle.

Butterfly Theorem. Let PQ , AB , and CD be three chords of a circle concurrent at a point M , with A and D on one side of PQ and B and C on the other side. If $PM = QM$, then $XM = YM$, where X and Y are the points of intersection of PQ with AC and BD , respectively.

The author's metamorphosis changes the setting to three concurrent cevians in a triangle. He then uses techniques developed in that context to give a simple proof of the Butterfly Theorem.

Enjoy!

169 Problems: 3226–3238

This month's "free sample" is:

3235. *Proposed by Geoffrey A. Kandall, Hamden, CT, USA.*

Let ABC be a triangle, and let A_1, B_1, C_1 be points on the sides BC, CA, AB , respectively, such that

$$\frac{BA_1}{A_1C} = \frac{CB_1}{B_1A} = \frac{AC_1}{C_1B} = k.$$

Let $\alpha = AA_1, \beta = BB_1, \gamma = CC_1$, and $\lambda = \frac{k^2 + k + 1}{(k + 1)^2}$. Prove that

- (a) $\alpha^2 + \beta^2 + \gamma^2 = \lambda(a^2 + b^2 + c^2)$;
- (b) $\alpha^2\beta^2 + \beta^2\gamma^2 + \gamma^2\alpha^2 = \lambda^2(a^2b^2 + b^2c^2 + c^2a^2)$;
- (c) $\alpha^4 + \beta^4 + \gamma^4 = \lambda^2(a^4 + b^4 + c^4)$.

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3235. *Proposé par Geoffrey A. Kandall, Hamden, CT, É-U.*

Soit respectivement A_1, B_1 et C_1 des points sur les côtés BC, CA et AB d'un triangle ABC , de sorte que

$$\frac{BA_1}{A_1C} = \frac{CB_1}{B_1A} = \frac{AC_1}{C_1B} = k.$$

Soit $\alpha = AA_1, \beta = BB_1, \gamma = CC_1$ et $\lambda = \frac{k^2 + k + 1}{(k + 1)^2}$. Montrer que

- (a) $\alpha^2 + \beta^2 + \gamma^2 = \lambda(a^2 + b^2 + c^2)$;
- (b) $\alpha^2\beta^2 + \beta^2\gamma^2 + \gamma^2\alpha^2 = \lambda^2(a^2b^2 + b^2c^2 + c^2a^2)$;
- (c) $\alpha^4 + \beta^4 + \gamma^4 = \lambda^2(a^4 + b^4 + c^4)$.

175 Solutions: 3125–3136