As a schoolteacher and sometime student, I have never considered myself a professional mathematician, reserving the term for those who are paid to do mathematical research or to apply mathematics. School mathematics teachers are paid to *teach* mathematics. This is a professional enterprise, but the profession is that of *teaching*, not that of *doing* mathematics.

I am delighted that some mathematics teachers continue to do mathematics for its own sake and I have argued elsewhere that we need a mechanism to ensure that *all* mathematics teachers continue to be mathematically active [1]. However, I have yet to see a contract or job description that required a school mathematics teacher to do any mathematics beyond that required to teach the students. In that sense someone like Nick Lord, a professional teacher who writes many fine mathematical articles, is an amateur mathematician.

Reference

1. Steve Abbott, Where have all the A level teachers gone?, *TES Friday Magazine*, October 2nd 1998, pp. 24-25.

DEAR EDITOR,

In the second paragraph of the letter from John E. McGlynn (November 1997) about the mathematics of bowls, I noted a discrepancy between his formula and subsequent statement concerning the skidding distance after launching a bowl. I agree with the result $\frac{5}{7}V$ for the speed of a spherical bowl when skidding ceases, but his expression $0.25V$ for the distance travelled at that stage caught my attention because it is dimensionally incorrect. My calculations (reproduced below) give $12V^2/49\mu g$, which does indeed increase when μ decreases.

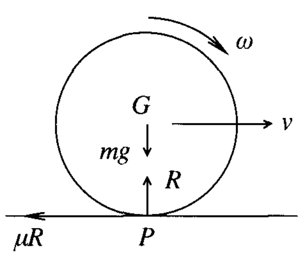

FIGURE 1

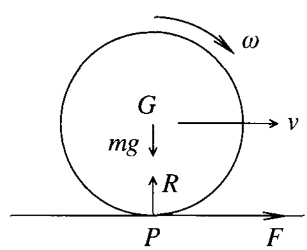

FIGURE 2

For a uniform spherical bowl of radius a, mass m, centre G and moment of inertia mk^2 about an axis through G, the equations of motion while skidding lasts are (Figure 1)

$$m\dot{v} = -\mu R, \qquad 0 = R - mg, \qquad mk^2\dot{\omega} = (\mu R)a,$$

so $\dot{v} = -\mu g$ and $k^2\dot{\omega} = \mu g a$. Since $v = V$ and $\omega = 0$ when $t = 0$, we have $v = V - \mu g t$ and $k^2\omega = \mu g a t$. The speed at time t of the contact point P of the bowl with the horizontal green is

$$v_P = v - a\omega = (V - \mu gt) - \frac{\mu g a^2}{k^2}t = V - \mu g\left(1 + \frac{a^2}{k^2}\right)t.$$

Skidding ceases when v_P becomes zero. i.e. when

$$t = \frac{V}{\mu g(1 + a^2/k^2)} = t_1 \text{ (say)}.$$

At this time,

$$v = V - \mu g t_1 = V - \frac{V}{1 + a^2/k^2} = \frac{a^2}{k^2 + a^2}V = v_1, \text{ (say)}.$$

As this shows $v_1 > 0$, *rolling begins* at $t = t_1$.

For $t \geqslant t_1$, the equations of motion are (Figure 2)

$$m\dot{v} = F, \qquad mk^2\dot{\omega} = -Fa$$

and $v - a\omega = 0$ (the rolling condition). The last two equations give $mk^2\dot{v} = -Fa^2$ which, together with the first, shows $-ma^2\dot{v} = mk^2\dot{v}$, i.e. $0 = m(k^2 + a^2)\dot{v}$, so $\dot{v} = 0$ and therefore (for $t \geqslant t_1$)

$$v = v_1 = \frac{a^2}{k^2 + a^2}V = \tfrac{5}{7}V$$

if we take $k^2 = 2a^2/5$; and then $t_1 = 2V/7\mu g$. The *distance skidded* is

$$d = \tfrac{1}{2}(V + v_1)t_1 = \tfrac{1}{2}(V + \tfrac{5}{7}V)\frac{2V}{7\mu g} = \frac{12V^2}{49\mu g}.$$

All this, however, ignores bias.

As a retired lecturer in mathematics with experience of teaching civil engineers, I was intrigued by John's final paragraph in which he sets 'geometry' apart from (the rest of ?) 'mathematics'—pure reasoning thought in contrast to mere brute calculation?

Yours sincerely,

FRANK GERRISH

43 Roman's Way, Pyrford, Woking GU22 8TB

DEAR EDITOR,

About 30 years ago 'Eperson's Conjecture' (that the sum of three consecutive square numbers can always be expressed as the sum of three other square numbers) was published in *The Mathematical Gazette*, and was proved to be valid by a number of readers who supplied algebraic formulae [1, 2]. In sorting out my papers (an accumulation of many years of investigations) I found today '*Eperson's Second Conjecture*' that three times the square of every odd number can be expressed as the sum of three other square numbers. I have tried in vain to prove this is valid but I have verified it from $3(3^2)$ to $3(23^2)$ as shown below.

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