Math of money doesn't always add up as expected

September 22, 2012 - 4:00am **BY JASON BROWN**

It's the start of term, and I am teaching two courses.

The first is Optimization, the maximization of profit and minimization of costs, subject to resource constraints, and the other is the Theory of Interest (which differs substantially from the Theory of Student Interest in the course).

The latter is a course on money and how it ebbs and flows over financial transactions. I haven't taught the course before, but I am looking forward to it. And it has brought to light a number of ways that math and money mix.

My wallet overflows now with membership cards for a multitude of stores, one being a local supermarket, which offers a 10 per cent discour on your 10th purchase.

When I pressed the cashier, I was told after receiving the card that you can't find out how many purchases you have made previously — y have to keep track yourself.

So I tried that myself, but found that on what I counted as my ninth purchase, for a grand total of $5.85, I apparently was on my 10th visit. I think celebratory balloons and flashing lights went off as I was handed my 59-cent discount. Wahoo!

I can't imagine anyone keeping proper track of store visits, so it really should be advertised as a one per cent average discount, which is what it turns out to be for most, I think. Right now, the card sits at home, as I can't be bothered to carry it.

While I'm on the topic of math and money, I sometimes have to laugh at the cleverness of some entrepreneurs. A couple of bars were havir open mike contests. Over the course of about four months or so, performers would vie for a $1,000 prize at the end of the contest. The way the winner was chosen was via ballots that patrons received with beers purchased.

I would just go for the enjoyment of performing, but I had friends who were serious about winning and would bring along friends to drink and simultaneously vote for them. Some arithmetic convinced me that I had the right attitude. I found out that the winner in one contest had over 400 ballots, so if a beer costs say $5.50, the ballots amounted to over $2,200 for the bar.

So if the lion's share of that money came from friends of the winners, then they paid over $2,000 for their friend to win $1,000. And that is only the beers that were bought by the friends of the winners (and there were many non-winners). Brilliant!

So after I realized this, I simply went out for the fun of it. Sometimes it's better to escape the race than to begin it.

Which brings to mind a classic two-person game that I'll have to play with my Theory of Interest class. In it I offer two people a loonie — all they have to do is bid on it. The one who bids the highest wins the loonie, no questions asked, but the second player has to pay me whateve his last non-winning bid was.

So here is how it always proceeds. Someone starts with a low bid, say a nickel, and the other raises the bid, say to a dime, and who wouldn want a loonie for a dime? Quickly the bidding accelerates, and as the bids get closer to a dollar, what happens?

The lower-bid player doesn't want to lose whatever she has bid, as she gets *nothing*, so she pushes herself to outbid her competitor. And th bids go up, well over a dollar, sometimes quite high.

This whole scenario is not as theoretical as it sounds. It explains a lot about why some companies are sold for prices that are way beyond their worth. It's something to watch out for. A great life lesson is to know when it pays to cut your losses.

Jason I. Brown is a professor of mathematics at Dalhousie University. He is the author of Our Days Are Numbered: How Mathematics Orders Our Lives.

About the Author »

By JASON BROWN