from the folks at mathNEWS

A WORD OF WELCOME

Doubtless, as math frosh (frosh--that's a term you're going to have to accept and live with; it simply means freshmen), you will already have been barraged with reams of information from both the university as a whole and the math faculty in particular. Well, the folks at mathNEWS have decided to add to that total. Hopefully, however, you will find our addition to be of much more enjoyment and interest than some of the university's paraphernalia accumulating in your mailbox.

What is mathNEWS? mathNEWS is sleepless Tuesday nights, luke-warm coffee, a gridword to help pass boring Friday classes, Honeywell crashes, the occasional pizza--in sum, a good way to spend a Tuesday evening. Moreover, mathNEWS is a news weekly (bi-weekly in the summer) which concentrates on student views of events and happenings within the Faculty of Mathematics.

mathNEWS is a relatively young publication but in its brief history has enjoyed a good deal of success. Our circulation for fall and winter terms has grown from 500 to 1500 (500 in the summer). The first issue appeared in the winter term of 1973. Hence this summer's issues comprise the fifth volume.

Who pays for it? You do. All math undergrads are required to pay a math society fee of $2.50 per term (this is required in the incidental fees on your fee statement). These fees total approximately

mathNEWS

DECLINE FORESEEN IN MATH ENROLMENTS

The University of Waterloo's Mathematics Faculty has developed a certain reputation--one that is apparently having effect on enrolments. This faculty has a first year student failure rate that is higher than any other university that offers similar first year courses. As a result there has been a 15% drop in the number of freshmen students naming Waterloo as their first choice university. However figures obtained by mathNEWS from the Registrar's Office show that university officials are remaining optimistic.

Recent statistics from R. J. Bullen, Assistant Registrar (Mathematics) reveal a projected math freshmen enrolment of 825 for the fall of 1974. This compares with a figure of 857 students who entered the faculty in the fall of 1973. Not only is the reduced number of new students contributing to the decrease in total enrolment but apparently more upper year students are failing to return (pun intended). The total number of undergraduate mathies expected in September is 2045 as compared to the 1973 figure of 2150. In addition 499 co-op math students will be on work terms from September to December.

It is also interesting to compare the number of students opting for the co-operative programme with those choosing the regular system. Using the projected data for this fall, over one-half (53%) of the students in this faculty will be in the co-op programme. Of the 825 incoming frosh 400 have chosen the co-op plan (415 of 857 last year).

It seems that there will also be a decrease in the number of freshmen students for the university as a whole. A total of 3600 first year students are expected as compared with 3667 in 1973. Come September the total university undergrad population is expected to be 11,000.

ELSEWHEN

Fragments from mathNEWS' files, Special Issue 1, August, 1973, one year ago this week: "...well summer's almost over (actually, it has been for the past month, it's just that no one has noticed yet). In a few weeks the campus will once more be buried beneath an Avalanche of Semi-Humanity..."; "...a cube of cheese, 3x3x3, is to be cut into 27 unit cubes. What is the fewest number of cuts needed, if we are permitted to rearrange the pieces after each cut?..."; "...all in all, I'm sure you will just _love_ Computing at Waterloo, and all I can say to you is: GOOD LUCK..."; "...we look forward to welcoming you to the University of Waterloo in September..."

$12,000 per year. Of this total close to 15% ($2000) finances mathNEWS for the year. Using this method of financing, we are able to distribute our paper free for all math undergrads each week.

mathNEWS has enjoyed one of the best reputations on campus for attracting new students to our fold. In fact, last year over 70% of our staff were frosh! Maybe you worked on a high school newspaper or year book. Such experience would be valuable but hardly necessary. Don't think that we are only looking for experienced help. Far from it! What we are looking for is enthusiasm. We need writers, typists, experts in handling a pair of scissors, gluers, cartoonists, pizza eaters, etc. Therefore to this year's 825, or so, math frosh we extend an open invitation to join our staff. Let's see this year's first-year involvement not only meet but topple last year's record of 70%.

In preparing this special edition of mathNEWS we have attempted to adhere to our usual format and have included many of our weekly features such as Elsewhen, The Gridword, This Week's Theorem, The Phantom's Report, Burloaf, Mathletics, etc. In addition we invited several individuals on campus to prepare words of welcome and information that might be of interest to you. Thus we hope that you will find something of interest in this effort.

So, from all of us at mathNEWS, enjoy what remains of the summer and, come September, entertain the thought of joining our team. Just think, you'll be a member of the student newspaper staff of the only Faculty of Mathematics in North America.
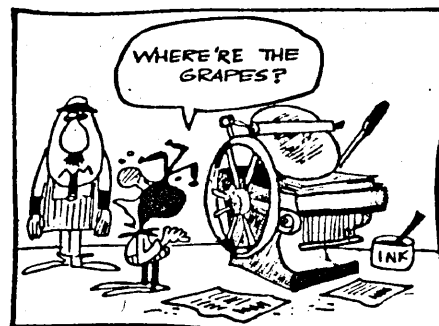
WHAT IS A PINKIE?

Besides being the fourth (or first, depending on which way you count) finger on either hand, Pinkie is the University of Waterloo's Mathematics Society's official mascot (usually spelled Mathscot).

As the legend goes...Once upon a time (sorry, that's the fairy tale version). Like I said, as the legend goes, there was a professor of mathematics who just loved to wear outlandish, gaudy coloured ties. It just so happened that this prof was also the founding dean of the math faculty. The mathSoc members at that time chose a tie as the official emblem and pink as the official colour.

Pinkie is not just a name for a symbol and that's another story.

During the construction of the Mathematics and Computer building, just as they were constructing the sixth floor, a group of mathies decided that the building was an ugly monstrosity (funny, some people still say that). They came to the conclusion that it needed a decoration of some sort. Late one Sunday night a couple of weeks later, if you happened to glance at the Math building about midnight, you would have seen 5 mysterious people working on the roof over the main entrance. Monday morning there was a 85 foot pink tie hanging down the front of the building.

The tailors of that tie have gone on to 'bigger and better things' and we got stuck with an eighty-five foot Pinkie (just think of the dry cleaning bills).

Pinkie was stored in the mathSoc office (MC3038) until recently. Now even the Phantom doesn't know where it is and I'm sure he couldn't care less but that's another matter.

Come September when all you frosh show up in a blaze of glory, or at least in a stampede, maybe Pinkie will have been found and you will spy it (how could you miss it) flying from the ugly mon...uh, I mean, from the Math and Computer building.

BURLOAF

There are two columns that make semiregular appearances in mathNEWS. These are "The Phantom", and "Burloaf". Both columns are written by "people" called programmers. According to that fine literary journal, PLAYBOY, a programmer is someone who believes in inflicting much pain and sorrow on himself. The only computer programs the author of this statement had seen were written in the programming language COBOL, which may explain his conclusions. However, you shall soon find out for yourself the validity of the statement.

Newcomers to U of W are usually impressed with everything they see (including the Debug terminal). As one learns more about Computing, the facilities provided grow worse and worse in his eyes, until he has a true picture of things. It is about these facilities that The Phantom and Burloaf write. Stuff contained is these columns is usually biased (Phantom/360 and Burloaf/6050), but we hope it will make intersting reading, just the same....

* * * * * * * * * * * * * * *

Like most fields of specialization, the field of computer science has its own jargon. When you are first introduced to computers, you will hear people mention many fancy words in relation to computers. Some of the most common are words like "crash", "down", "FUBAR" (f**ked up beyond all recognition), "bug", "abort", "fault", and "system error". Along with the aforementioned words, computer people often use another set of words, common to all fields of endeavour, but not suitable for mention here.

There are about ten computers in the math building. The major computing body is the "Computing Centre". The computing centre has an IBM/360 75 (soon to be replaced), an IBM/370 145, an operating IBM/360 44, an inoperative one, two IBM 1620's, and an IBM 1710.

The 360 75 handles the major bulk of computing done by the Computing Centre. The 370 supports VM, which is the latest thing from IBM. Unlike on older machines, where you were like a user within a well defined piece of hardware, VM allows you to "define" your own machine. This defined machine is called a "virtual machine", mainly because it doesn't really exist, but is rather a figment of the 370's imagination. One feature virtual processing allows you is the simulation of much storage, when in fact there exists only a small amount of memory.

The operating 360 44 runs APL, or "A Programming Language". APL is an "interpreter", which allows the user great freedom in his programming and the benefits of an interactive system. The power of the language is demonstrated by the way that programs that take pages in many other languages can be written in a few lines of APL. For instance, there is a one character operator to invert a matrix. However, APL pays for its flexibility by being very slow and somewhat limited in amount of storage available.

One 1620, a model 1, sits in the debug terminal room, and can be used by anyone. It has a powerful machine language that allows one to define numbers of any length he likes (as opposed to fixed lengths on most other machines). Other features make it good for number crunching. The 1620, however is of quite an old design, and is fantastically slow. The IBM 1710 is locked away, but if one shows enough enthusiasm, they may get accepted into the group of people who have been granted access to the room. Another 1620 resides in the 1710 room, hardly used, because of strange contract terms we have with IBM, as I understand it.

The famed Debug terminal allows the student easy access to various processors such as FORTRAN and ALGOL. The processors provided are specially designed for student use, and make sure you infringe upon no rule of the programming language, or do silly things such as illegal subscripting that might let you write all over core. These features speed debugging of programs. Hardly any program, when first written, does what you expected it to do. Debugging is the name of the procedure that involves making corrections to cause the program to do what you wanted it to do. The nature of the compilers offered on debug, namely the way they maintain constant vigilance over your executing program make them good for running class assignments. These programs are traditionally quite short, and are usually discarded immediately after they are debugged and functioning properly. However, Debug is not the place for the serious programmer. While the continual execution time checking of program execution speeds debugging, it slows execution speed quite a bit. The usually inefficient code generated, combined with the run time monitoring cause "production" runs of a program to proceed much slower than they should. Also, while the 5 second, 5 page limit imposed on all jobs run on the Debug is sufficient for the small class assignments, these limits prevent one from running all but a few serious programs to completion.

At this time, the inoperative 360 44 is sitting in the room with the 1710, not in use because of insufficient air conditioning capacity. Unlike humans, who work in a wide range of environments, machines require more precisely controlled temperature and humidity levels.

Separate from the Computing Centre is the Math Faculty's Computing Facility, the Honeywell 6050. The Math Faculty used to own an IBM/360 50 which they ran APL on. Two years ago, they got rid of the 360, and acquired the Honeywell machine. The reason Honeywell was chosen over IBM was because Honeywell supports TSS. Unlike Batch, where you submit a card deck, and then wait

3

for the output, TSS, or Time Sharing System, allows the user to write programs in any one of many languages and run them interactively (i.e., you can "talk" with the computer). Honeywell 6050 hardware design is much better suited to supporting TSS than is the IBM 360. In fact, IBM's attempt at TSS turned out to be a disaster, and now IBM only supports TSO, which allows users to sign on to things like Wylbur, which are much more limited in their powers. Whereas 360 TSO is used mainly to facilitate usage of batch (Wylbur is a text editor that allows one to create, modify, and run programs in batch), Honeywell TSS allows one to run programs, written in languages such as Fortran, Algol, and Gmap (6050 assembler), interactively.

Several departments in the Math Faculty have PDP machines. However, unless you are someone special, they feel the less you see of their machines, the better.

The Computing Centre is a separate entity from the Faculty of Mathematics. The Faculty pays the Computing Centre fees for usage of various Computing Centre facilities. Due to recent modifications in the pricing structure for Computing Centre services, it has become expensive to use C.C. services. This is why the Math Faculty would much rather have you (as a math student) use their Honeywell 6050. Unlike the Computing Centre, with its "account numbers for the privileged few" policy, the Math Faculty makes it easy for you to obtain your own Honeywell Userid. Once obtained, you can sign on, write programs, run them and save them. The services offered are much more varied and extensive than those offered by Debug, the only contact, a "casual user" gets with C.C. facilities (In fact, there is really no comparison.)

Because the Computing Centre loves to see green stuff for anything they do, it is hard to get access to machines, especially for the ordinary student. The Computing Centre, by this policy, creates an "aloof" attitude to the average student interested in computers, but not in a course requiring an account number. This attitude causes many of the smarter students to pit their wits against the C.C. organization. Many students get a feeling of pride and acomplishment when they find system bugs (problems) that they can turn to their advantage.

On the Honeywell, the attitude is more of a "work with the students" one. Because of this attitude, the Math Faculty gets much system software written for them by interested students. Recently, Honeywell gave the Math Faculty new hardware in return for a TSS version of APL, a system written almost entirely by students. The Math Faculty Computing Facility staff is much more receptive to projects that are worthwhile, but not revenue producers, such as the Chess project, which has produced the Canadian computer chess champion, and the production of this paper. Another advantage of TSS is its ease of use. Building, editing, correcting and running programs is much easier when done interac-

tively (although it is more expensive) than when it is done on punched cards.

You will tend to find that students, when given assignments in computer courses, always show good judgement and foresight in completing them. This is supported by the fact that computer usage is always highest the night before the assignment's due. During peak periods, students have had to wait as much as four hours to run jobs on the Debug terminal. On TSS, people were waiting until after midnight for a terminal. Usually, though, turnaround is not this bad.

FASSCINATING

One of Waterloo's oldest traditions is the annual FASS show in February. And one of FASS's oldest traditions is that math students -- and faculty -- play an important part in script-writing, backstage work, acting, singing, jesting, and partying as the show is put together and goes on.

FASS stands for Faculty, Administration, Staff, and Students. Those are the four elements of the university, and while they may seem at odds most of the year, they always manage to get together for FASS, to poke fun at the things around Waterloo which drive them crazy the rest of the time.

If your hidden talent is for writing (and it doesn't matter how hidden it is -- FASS will bring it to light), then watch for the general meeting which will be called early in the fall term. If you think you'd like to appear on stage (and it doesn't matter whether you have the talent to do anything once you get out in the spotlight) then come along to the general meeting, keep FASS in mind, and don't miss the auditions in January.

If all you can do is drink beer, there's a spot for you in FASS anyway. Come on out and find it. And remember the name: FASS. A farce to be reckoned with.

CAREER PATHS

Those enrolled in Mathematics will be invited to attend a half day of career talks which will be held on campus on September 26. Students will be able to attend up to four different sessions in the afternoon. Several different career paths will be described by people who are knowlegeable in their respective fields. Speakers have indicated that they will gladly entertain questions during a discussion period after each presentation.

Further details of this programme will be made available in early September.
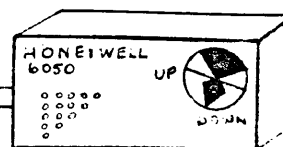
∫ ∫ ∫ TO HELL WITH INTEGRATION, MY SON AIN'T RIDING NO BUS TO SCHOOL EVERY DAY!
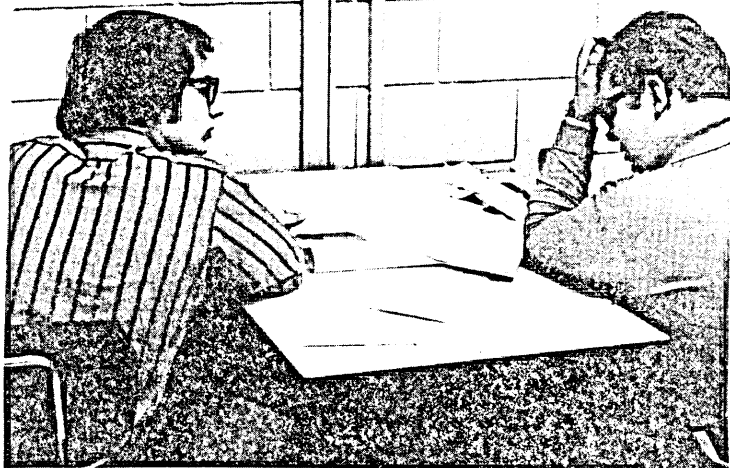Tonto

Birth of math NEWS

First you write
the articles..
no John, you use
the other end of
the pencil......

photos by
RICHARD DEVITT
text by
DENNIS MULLIN

HONEYWELL
6050   UP
DOWN

Then each article is typed
in.......with an occasional
stop for translation.....

Next the article is roffed (just think-if you
joined mathNEWS you might discover what that
means)and proofread,and any mistakes are cor-
rected..... unless someone accidently deletes
the article.
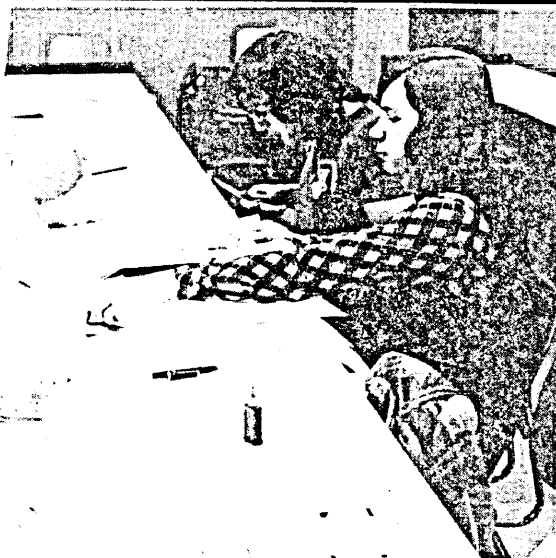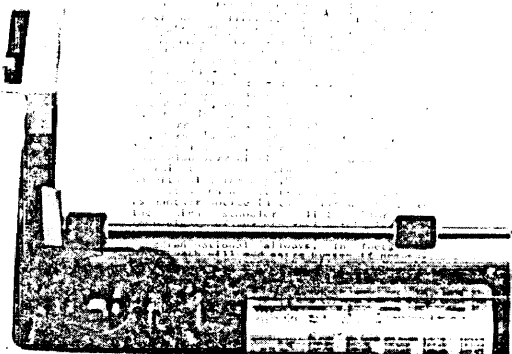
When the final version of the article is run off it is dashed
back to MC 3011 (or equivalent) where......it may get lost or
if we're lucky it gets cut up and secured to the raster pages.
Add some titles and then gather round to proofread the final
copy.
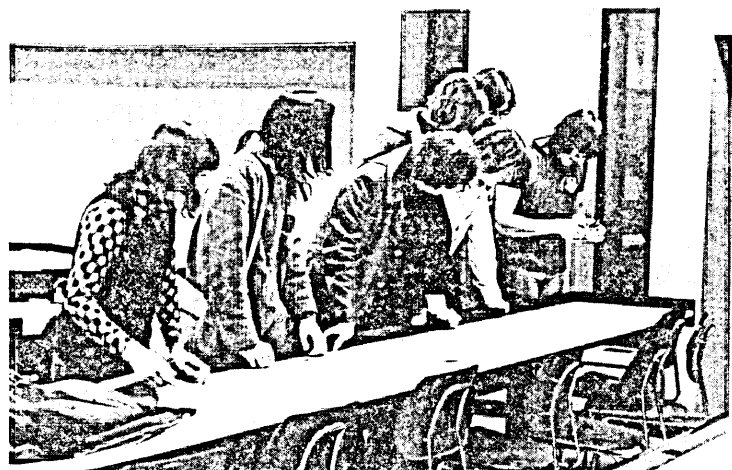
Then all that's left to do is clean up and
find someone who will be awake at 8 a.m.
to deliver the masterpiece (sorry,master-
pages) to the nice people at Graphic Serv-
ices.

Then a couple of days later you can pick up
your copy of mathNEWS and say:"We put that in??!!"

student government
MATHSOC

The University of Waterloo Mathematics Society (mathsoc for short) is the official student organization representing undergraduate math students. All mathies automatically become mathsoc members by paying a $2.50 fee per term (paid as part of incidental fees on tuition fee statements). This fee is refundable.

The math society office is located on the third floor of the Math and Computer building in room 3038.

Various mathsoc officials were invited to contribute to this special edition of mathNEWS. Their contributions follow.

from the summer prez

Welcome to Waterloo, where most of you, hopefully, will spend the next four or five years as Mathematics students. About 50% of you folks out there will be entering the Co-op programme which means you will be faced with something you're not quite sure how to react to: studying during the summer. Co-op students spend two of their eight school terms here during the May - August term either 1B and 3A, or 2B and 4A. Most find it extremely enjoyable. Here's why.

Many of you may be discovering what the housing crisis is all about, looking for reasonable digs for the fall. Not so in the summer. There are usually lots of sublets and leased accommodations available. The warm weather encourages getting up early and cycling or walking to the university -- even for those dreaded 8:30's. Much better than getting up before the sun, as happens in December. Once you get to the university, you'll find everything to satisfy your academic, athletic, cultural, and social needs is readily available. First of all, you won't be wearing a heavy winter coat and wondering where you left your umbrella or gloves or whatever. Shorts and a T-shirt. Maximum comfort. Sitting in an air-conditioned lecture hall makes class atmosphere more comfortable and relaxed. The debug terminal isn't jammed with other users when you go to run your Fortran, Cobol, or Watmap job. Why, you can even get an APL terminal -- or what's really at a premium, one of the terminals to the Honeywell.

As for athletics, there is a full schedule of competitive and co-ed leagues in such sports as volleyball, slo-pitch baseball, and inner tube water polo. You'll find reserving a squash court is much easier too. Hot day? Take a swim in the pool, or take a short drive to the quarrie at Elora. Don't be surprised if you meet one of your profs on the squash or tennis court.

If getting involved is your thing, come out and join the mathNEWS staff or help mathsoc run the coffee and donut stand. The Federation of Students, too, is always looking for new faces to participate.

The pressures of assignments, midterms and exams are quickly forgotten at the Campus Centre pub, where you can unwind after a heavy week of studying.

Above all, remember, you will be a student, and you'll find not-all-that much spare time for fun and frolic. However, with the agreeable weather, you'll be in a much more agreeable frame of mind when you tackle that Calculus assignment, and you'll find those trigonometric substitutions will just roll off your pencil.

So don't let the thought of studying during the summer discourage you. I'm sure you'll love it. Good luck, see you on the ball diamond!

Paul Armstrong

Paul Armstrong
Mathsoc President, Summer '74

fall/winter chief writes

Welcome First Year Students!

As president of your Math Society I would like to welcome you to the University of Waterloo and the Math Faculty.

One of its functions is to give instant relief from nagging assignments and migraine mid-terms. This relief comes from serious drinking, classic movies, ski-trips, bridge tournaments, chess tournaments, etc., etc., etc.

The athletic side of Math Soc provides organized (?) teams competing in all types of intra-mural sports such as flag-football, basketball, broomball, hockey, water-polo, and giving blood. You don't have to be good at these sports, just enthusiastic!

Finally there is an educational side to Math Soc. We have solid communication between faculty and students as well as clubs which are educationally _and_ fun orientated such as the Computer Science Club.

As you will soon discover, a great deal of the learning process at University will take place outside of the classroom -- meeting people, getting involved in anything, and most important, learning more about yourself.

We hope to be of help to you in the social, athletic and educational side of your university life. There are always positions open if you are inclined to get involved.

Please drop in to the Math Soc office (MC 3038) to pick up your FREE (well, you've already paid for it) Anti-calendar (a book designed to help you select your Math courses) and to get your I.D. card stamped which enables you to participate in all Math Soc activities.

Best of luck in your studies,

Jim Langer
President, Math Society

and, orientation plans

MathSoc is planning events for the three week orientation period in September to keep us busy and you entertained. On the drawing board we have.....

-Cartoon pubs. Monday, Tuesday and Wednesday (September 9, 10, 11) in the Campus Centre watering hole. Afternoons from 12-5. Take a break, have a few laughs/beers and join the fun, ...free admission.

-Bike rally and barbeque, Thursday September 12. In conjunction with the intramural fun day on the Village green Mathsoc plans to run a get-to-know-the-area bike rally. Bring your bike, blow up the tires and roll. Starting time will be around noon and there will be nickel hot dogs and root beer in the late afternoon at the Village Green (we'll let you know how to get an entry form and route clues later). There will be prizes for the bike rally winners.

-Outdoor record hop with greasy, oldie, mouldie rock 'n roll music provided by Radio Waterloo. We're looking to run this one evening(7-10) the following week(16-20). If it rains we'll move into the Campus Centre.

-Somewhere in this issue you will find a free coffee and donut coupon (it's not hidden). It's good only for one week(16-20). Be sure and use it; the donuts are great. Coffee and donuts are on sale in the Math Lounge (most mathies hang out there) on the third floor of the Math building . Come on in and get yours free. You'll be surprised how it will help you recover from those 8:30 a.m. classes.

-The most successful event mathSoc sponsors is the wine and cheese parties for first year students only. Get to know others in your year and have a good time on us.

Keep your eye on mathNEWS, the Chevron(student newspaper) and the Gazette(the University's newspaper) for more details on orientation events. There's a lot happening, have a good time and watch for mathSoc sponsored functions (especially the wine and cheese nights, they are for frosh only because we can't afford to let everyone in). Right now I'm off to dig up funds to run mathSoc's orientation contribution...

Andy, Friends and Co.
mathSoc orientation

HORSE SENSE

There was once a brilliant horse whose owner was able to teach it almost all of higher mathematics. This genius horse could do Algebra, Calculus, Topological Transformations, Reimann Geometry, Probability and Statistics, Information Theory, etc., etc., etc. But the same horse, surprisingly, was completely unable to understand (Descartes) Cartesian Co-ordinates. All of which goes to prove that one should not put Descartes before the horse.

C.S.C.

Under jurisdiction of mathSoc is the Computer Science Club. The CSC meets about once a week, discussing(naturally) computer languages, arranging field trips and bringing in speakers.

The CSC also supports projects, the most infamous of which is the computer chess program, Ribbit, which is the 1974 Canadian Computer Chess Champion. It is representing UW and Canada in the First World Computer Chess Championship in Stockholm, Sweden, in August 1974. Ron Hansen and Jim Parry are going to Sweden to run the program and then will go on to Edinburgh to visit the School of Artifical Intelligence.

3rd FLOOR HAUNT

One of the favourite haunts of mathies is the large student lounge situated on the third floor of the Math and Computer building. A major drawing card there is the Coffee and Donuts (C&D) stand--a student-run, student-funded source of a cheap breakfast, lunch or coffee break.

The C&D stand originated in the fall of 1971 with its purpose being to counter the rising prices and questionnable quality of vending machine effluent. The stand was an instant success and since that time has expanded its services. In addition to the stand-bys of coffee and donuts, the fare now includes Kaiser roll sandwiches, soup, hot chocolate, lemonade plus such items as matches and pens. Prices are set on a break even basis.

Students are hired on a part-time basis to man the stand. Early in September a list requiring workers should be posted on the third floor of M&C on the bulletin boards across from the lounge. Anyone who might welcome a couple of extra dollars per week should keep this opportunity in mind. The pay is $1.50 per hour.

To introduce the incoming math frosh to this service, mathNEWS and the '74 math orientation committee offer the following coupon which can be redeemed at C&D during the dates specified. Clip it and bring it along in September.

NAME _____

PHONE_____

###
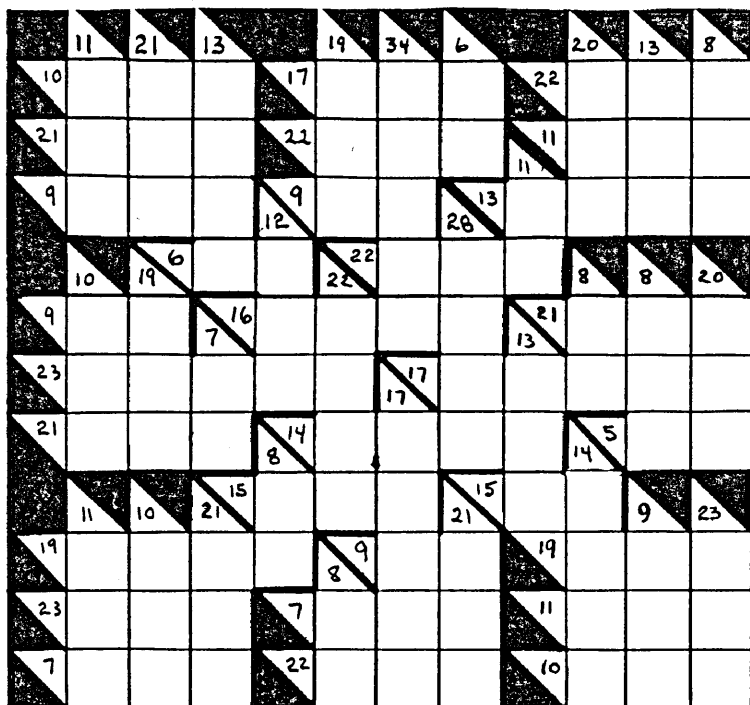
In this type of gridword, the numbers represent the sums of the digits which you enter into the blank squares. The number written above the diagonal line refers to the squares to the right of it. The number written below the diagonal line refers to the squares beneath it.

RULES:
1. No zeros allowed.
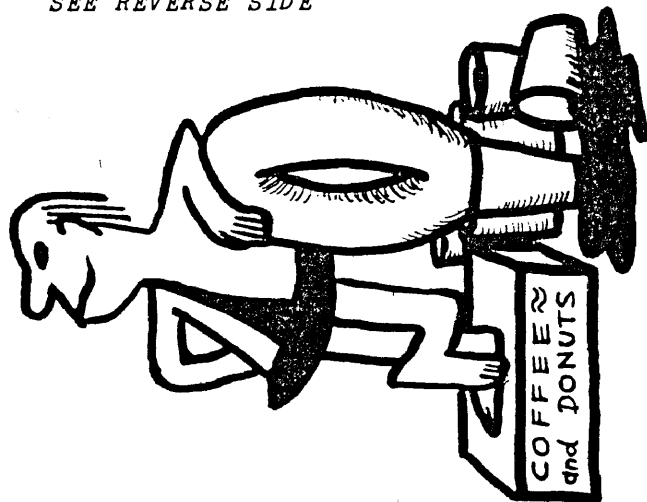2. Each square contains a single digit.
3. A digit may appear no more than once in any combination.

WINNERS:
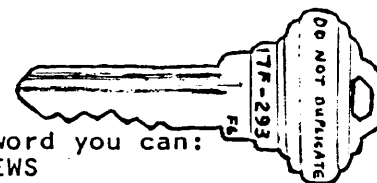There will be ten(10) T-shirts given away. To win one you must:
1. Be frosh.
2. Turn in a correct solution on(or before) September the 13th.
3. Have your solution chosen in the random draw.
4. Have your name on your solution. (up&over)

SEE REVERSE SIDE

To submit your gridword you can:
1. Mail it to mathNEWS
                MC3038
                University of Waterloo,
                Waterloo, Ontario.
2. Put it in our mailslot in the mathSoc office(MC3038).
3. Put it in our MAILBOX(outside the 3rd floor math lounge).
 Normally mathNEWS gives out 1 T-shirt,but since Orientation is footing the bill we're giving out 10.

The winner of issue 5.6(our last regular issue) was: ALEX KOWALENKO
There were 8 other correct solutions. They were submitted by Dave,R.A.S.,Brenda(plus Kevin & John),Dave,Ted,Joanne,Bob, and Louise+Frank.

mathNEWS gives out a free T-shirt to the creator of a gridword that we use. Not all gridwords are like the one we have here. Quite a few involve words only. And in case you wonder there is a unique solution to this week's gridword.

This fall we will need a gridword editor. The duties of a gridword editor are to be sure there is a gridword for each issue;to make sure the gridword page is correct(normally it occupies a full page);to write the gridword comment; and to determine the winner of the last contest.
 I will be leaving some helpful(??) hints and some gridwords which have not been used yet.

You may be wondering about the keys. There is no special significance to them. Each key is from an issue published this summer(5.1;5.2;etc). Graphic Services shrinks our masterpages to 80% so our keys become smaller. One of the keys is the mathSoc key. Have a good fall.

this ∑ THEOREM week's

In mathematics, one can write down many statements, or "formulas". If a formula is true under all circumstances, it is considered to be a theorem. Mathematics abounds with theorems. There are also things called axioms. An axiom is a formula that we accept to be true. A formula that can be "proved" from basic axioms is a theorem.
    Much of the effort spent in mathematics is used in devising techniques to prove things, and using these techniques to prove various statements. The purpose of this column is to use various valid

Q.POD

COFFEE and DONUTS

(THEOREM, cont'd from previous page)
techniques to prove things that aren't true.

Many methods of proving things exist. One method, very popular in Calculus textbooks is the use of the "clearly" connector. The clearly connector is used to connect two unrelated ideas that are both true. It takes many forms, including "from the above, clearly it follows that...", "it is immediately apparent that", and "from this, it obviously follows...". An example of the clearly connector is:

$$\cos^2 x + \sin^2 x = 1$$

Clearly, it follows that
for every integer > 1, there exists a unique factorization into prime numbers.

Although mathematical textbooks use the clearly connective liberally in proofs, its use by students is frowned upon. This means the student usually has to resort to other methods of proof.

One method involves taking what you are given, and what you are supposed to prove, and joining the two statements with anything that sounds good. For instance:

PROVE: $(x^2 - y^2) / (x - y) = x + y$

PROOF:
$$\frac{x^2 - y^2}{x - y}$$

cancelling:
$$\frac{x - y}{\cancel{x} - \cancel{y}}$$

cancelling sign:
$$\frac{x \cancel{+} y}{\cancel{x} \cancel{+} \cancel{y}}$$

everything on the bottom is gone, so we have:
$$x + y$$

Whereas the above methods are used to prove true things, "This Week's Theorem" uses legitimate methods to prove garbage. You probably think there are things like fallacies in the proofs, but remember, it was the philosopher Godel who said that there is no system that is complete and consistent with respect to validity if the intended output is the set of arithmetic truths. This means that, it is impossible to dream up a set of procedures that will prove anything that is a theorem of arithmetic (e.g., $2+2=4$), but will not prove anything that is not arithmetically correct..

An example is the following theorem.
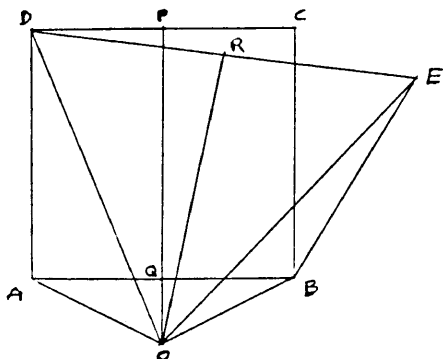
GIVEN: SQUARE ABCD AND LINE $\overline{BE}$ SUCH THAT $\angle ABE$ IS AN OBTUSE ANGLE OF A GIVEN VALUE.

REQ'D: PROVE $\angle ABE$ IS A RIGHT ANGLE.

CONSTRUCTION: LET P, Q BE THE MIDDLE POINTS OF $\overline{CD}$ AND $\overline{AB}$. TAKE $\overline{BE}$ EQUAL IN LENGTH TO A SIDE OF THE SQUARE. LET THE PERPENDICULAR BISECTOR OF $\overline{DE}$ MEET $\overline{PQ}$ AT O.

PROOF: BY SYMMETRY, $\overline{PQ}$ IS THE PERPENDICULAR BISECTOR OF $\overline{CD}$ AND $\overline{AB}$.

CONSIDER $\triangle$'S ORD, ORE

$\quad OR = OR$
$\quad \angle ORD = \angle ORE$
$\quad RD = RE \qquad$ (CONSTRUCTION)
$\therefore \quad \triangle ORD = \triangle ORE \quad$ (SAS)
$\therefore \quad OD = OE$

CONSIDER $\triangle$'S OQA, OQB
$\quad OQ = OQ$
$\quad \angle OQA = \angle OQB \quad$ ($\perp$ BISECTOR)
$\quad QA = QB \qquad$ (CONSTRUCTION)
$\therefore \quad \triangle OQA = \triangle OQB \quad$ (SAS)
$\therefore \quad OA = OB$
$\therefore \quad \angle OAB = \angle OBA$

CONSIDER $\triangle$'S OAD, OBE
$\quad OA = OB \qquad$ (PROVED)
$\quad AD = AE \qquad$ (BE = SIDE OF SQUARE)
$\quad OD = OE \qquad$ (PROVED)
$\therefore \quad \triangle OAD = \triangle OBE \quad$ (SSS)
$\therefore \quad \angle OAD = \angle OBE$

NOW, POINT O ON $\overline{PQ}$ MAY BE EITHER
(i) BETWEEN P AND Q
(ii) AT POINT Q
(iii) BEYOND Q (AS SHOWN)

CASE i:
$\angle ABE = \angle OBE + \angle OBA$
$\qquad = \angle OAD + \angle OAB$ (PROVED)
$\qquad =$ A RIGHT ANGLE.

CASE ii:
$\angle ABE = \angle OBE$
$\qquad = \angle OAD \qquad$ (PROVED)
$\qquad = \angle BAD$
$\qquad =$ A RIGHT ANGLE.

CASE iii:
$\angle ABE = \angle OBE - \angle OBA$
$\qquad = \angle OAD - \angle OAB$ (PROVED)
$\qquad =$ A RIGHT ANGLE.

HENCE

$\angle ABE =$ A RIGHT ANGLE

⊟ Q E D ⊟

$$\int_1^{mower} \frac{dx}{x} = \ln mower$$

$$\int 3\, ice^2\, d\, ice = ice^3 + C$$

math⚾ETICS

Mathletics includes all the sports you are used to playing (competitive: football, soccer, baseball, basketball, hockey, etc.) plus a few you may not be used to playing (recreationally: co-ed inner tube waterpolo, co-ed broomball).

If you're afraid you're too rotten to play don't worry; most of the sports are recreational and we don't care if you're not very good because it's all in fun.

The main thing is to get involved and meet the other guys and girls on the teams and have a good time.

Remember when you're sitting in that class with 250 other frosh in first year calculus and you don't even know the person sitting in the next seat, you are definitely wanted by mathsoc to play on one of our teams. So haul your ass up to room 3038 and meet some friendly people. We guarantee smiles.

Gary Dryden
Summer Sports Rep

IMPURE MATH

Once upon a time (1/T) pretty little Polly Nomial was strolling across a field of vectors when she came to the edge of a singularly large matrix.

Now Polly was convergent and her mother had made it an absolute condition that she must never enter such an array without her brackets on. Polly, however, who had changed her variables that morning and was feeling particularly badly behaved, ignored this condition on the grounds that it was insufficient and made her way in amongst the complex elements.

Rows and columns enveloped her on all sides. Tangents approached her surface. She became tensor and tensor. Quite suddenly, three branches of a hyperbola touched her at a single point. She oscillated violently, lost all sense of directrix and went completely divergent. As she reached a turning point she tripped over a square root which was protruding from the erf and plunged headlong down a steep gradient. When she was differentiated once more she found herself, apparently alone, in a noneuclidean space.

She was being watched however. That smooth operator, Curly Pi, was lurking inner product. As his eyes devoured her curvilinear coordinates, a singular expression crossed his face. Was she still convergent, he wondered. He decided to integrate improperly at once.

Hearing a vulgar fraction behind her, Polly turned round and saw Curly Pi approaching with his power series extrapolated. She could see at once, by his degenerate conic and his dessipative terms that he was bent on no no good.

'Eureaka', she gasped.

'Ho, ho', he said. What a symmetric little polynomial you are. I can see you're bubbling over with secs.

'O sir', she protested, 'Keep away from me. I haven't got my brackets on'.

'Calm yourself my dear', said our suave operator, 'Your fears are purely imaginary'.

'I,I', she thought, 'perhaps he's homogeneous then'.

'What order are you', the brute demanded.

'Seventeen', replied Polly.

Curly leered. 'I suppose you've never been operated on yet', he asked.

'Of course not' Polly cried indignantly, 'I'm absolutely convergent'.

'Come, come', said Curly. 'Let's off to a decimal place I know and I'll take you to the limit'.

'Never', gasped Polly.

'Exchlf', he swore, using the vilest oath he knew. His patience was gone. Coshing her over the coefficient with a log until she was powerless, Curly removed her discontinuities. He stared at her significant places and began smoothing her points of inflexion. Poor Polly. All was up. She felt his hand tending to her asymptotic limit. Her convergence would soon be gone forever.

There was no mercy, for Curly was a Heavyside operator. He integrated by parts. He integrated by partial fractions. The complex beast even went all the way around and did a contour integration. What an indignity. To be multiply connected on her first integration. Curly went on operating until he was absolutely and completely orthogonal.

When Polly got home that evening, her mother noticed that she had been truncated in several places. But it was too late to differentiate now. As the months went by, Polly increased monotonically. Finally she generated a small but pathological function which left surds all over the place until she was driven to distraction.

The moral of our sad story is: If you want to keep your expressions convergent, never allow then a single degree of freedom.

the phantom reports

WHAT can you expect in the way of computing at Waterloo? There are several computer languages the beginner is expected to learn, such as WATFIV, WATBOL, WATMAP and WATIAC. WATFIV is the descendant of WATFOR (If you think this place is getting into a rut, you need only look at the names we give our computer languages to be reassured). If anyone out there hasn't heard of WATFOR, it is the local dialect of that internationally famous programming language "FORTRASH" (short for FORmula TRASHification, or some such...). Recently this particular language is being phased out, perhaps due to the exhaustive efforts of that nebulous but determined group known as SHAFT (Society to Help Abolish Fortran Teaching), but nevertheless it lingers on as an excelent exhibition of the University policy of always giving bad examples. WATBOL, on the other hand is a less successful local version of that infamous misconception of some paranoid halfwit's undernourrished imagination known as COBOL (COnfusing Blunder Oriented Language or something like that). It is a good example of what happens if you try to speak English to a computer ... In the time given one might be able (with work) to learn as much as three eighths of the language. Of course, you can't do anything useful without understanding about five to seven eighths ... but then no one expects you to do anything useful in first year (or second or ...).

After all this, WATMAP comes as definite relief ... it isn't supposed to look like any other language and is merely a potluck conglomeration of all the assembly languages you ever heard of, plus a few we made up ... Naturally, it isn't the fastest assembler you will ever see, but, after all, what can you expect from something that's written in COBOL (which of course is written in assembler). I won't say anything about WATIAC except that it is what they pretend to translate WATMAP into. Who knows ... someday when the plumbers find eight positions for a switch to be in other than "ON" and "OFF", it might actually be possible to build a computer that thinks in WATIAC.

One could, of course, expect better in second year, if one were extremely optimistic ... For second year, you will supposedly learn ALGOL, SNOBOL, L6 and PL/1. In actuality you will probably learn some ALGOLW and SPITBOL which bear some vague resemblance to ALGOL and SNOBOL, (not necessarily in that order). As for L6, in three or five more years we may actually have it ... at which time someone might even feel able to teach it ... we would have had it last year, but someone signed the contract on the wrong line. In the meantime, we make due without it though we could perhaps use LISP as a substitute since it is one of the few languages that does about the same thing. Unfortunately there is the slight difficulty that the average LISP program is 26.7% left parentheses, 25.4% right parentheses, and

19.3% blanks to break the monotony. And then there's PL/1, which some incompetent suggested be taught as a filler ... given a year course in PL/1, you might be able to learn enough of it to qualify as an amateur PL/1 programmer ... if you have a photographic memory ... or to put it a little differently ... PL/1 is the only programming language that won't fit in a computer ...

In order to run all these marvelous languages, UNIWAT has pioneered the use of an amazing device for the consumption of paper and generation of litter. It is known as a DEBUG Terminal if you want to be polite about it ... (most people don't tho ...). It is served by several dozen broken and antiquated Key punches. The theory behind this "service" seems to be that it is better to stand in line for 20 minutes or so, than to go off somewhere and do something which might let you forget the miserable certainty that no job longer than 10 cards ever runs first time without divine intervention. But don't let this discourage you!! At times turnaround has been as little as two minutes, and the worst it has been is four hours (except during crashes).

If all this has depressed you, fear not! The Math Faculty has its own computer, officially called the MFCF (Mathematics Faculty Computing Fallacy), but known to everyone as "the 'bun".

The 'bun has almost all the languages you are ever likely to have the misfortune to encounter, including Y-FORTRAN, JOVIAL, FUNNYAPPLE, ABC, QED (also known as WMXPL - World's Most Xpensive Programming Language) and B (for the 'bun's grade of service).

The 'bun has actually done quite well over the past year, and only misplaced the file system and/or operating system a half dozen times or so. However, there is the occasional problem like being mistaken for a septic tank, or being hit by lightning ... (and now ... the answer to the question you've all been waiting for ... Why is the 'bun so crummy? ... obviously ... stale design!!)

All in all, I think it's safe to say that you will just love computing at Waterloo ... especially with the new accounting policies which let the prof control how many runs a student gets to solve the problem (don't worry, most Prof's haven't heard about that feature ... yet) ....

IT'S BEEN SAID

"The different branches of Arithmetic - Ambition, Distraction, Uglification, and Derision "
-The Mock Turtle ('Alice in Wonderland')

"Mathematics is the Queen of the Sciences, and Arithmetic the Queen of Mathematics."
-C.F.Gauss

"Every 'new' body of discovery is mathematical in form, because there is no other guidance we can have."
-C.G.Darwin (1931)

CALENDAR

SUN	MON	TUE	WED	THUR	FRI	SAT
1	**2** LABOUR DAY Campus Centre Pub(noon-1am)	**3** St. Jerome's Pub Rally(afternoon) Dance CC Pub(noon-1am)	**4** St. Jerome's Pub Films(afternoon) CC Pub(noon-1am) Food services Pub (8:30-12:00)	**5** St. Jerome's Pub Dance Food Services Pub(8:30-12:00) Village1 Pub in Great Hall 9-1	**6** CC Pub(noon-1am) St. Paul's Hayride and Barn Dance St. Jerome's Scavenger Hunt Village1 pub 9-1	**7** CC Pub(noon-1am)
8 St. Paul's Mini Olympics St. J's Toboggan Races(afternoon) Barbeque & Coffee House(evening) Arts Soc Picnic with Labbats Balloon	**9** Club Day(9am-11pm) in Campus Centre Cartoons in CC Pub(noon-5pm) sponsored by mathSoc Information Waterloo in CC	**10** MIDWAY(??) Scavinger Hunt by the Feds Cartoons in CC Pub(noon-5pm) by mathSoc	**11** MIDWAY(??) Free outdoor Concert(Waterloo Park) Balloon rides by McDonalds Tobacco(Decker Bus) Feds Village1 Pub (red & green)	**12** MIDWAY(??) Intermural Fun Day on Village Green(afternoon) Free Jazz Concert in CC(9pm) Pub Crawl(Double Decker Bus) Feds mathSoc bike rally & barbeque	**13** MIDWAY(??) Arts Soc Pub at Food services GRIDWORD DEADLINE all-nite horror movies CC(midnite	**14** MIDWAY(??) Optometry Golf Tournament Village1 Pub (red & green) SciSoc Pub at Food Services
15 Optometry Sports Day(Columbia Field)(afternoon)	**16** C&D free coupon is now valid	**17** C&D free coupon is now valid Steppenwolf in concert in the gym	**18** C&D free coupon is now valid Moe Kaufman concert in Humanities Theatre Optometry Pub in Food Services	**19** C&D free coupon is valid Food Services Pub by Feds	**20** Last day to cash in C&D coupon Food Services Pub by Feds	**21** Optometry car/bike rally and Barbecue at Columbia Field Food Services Pub by Feds
Other Dates	*sept 25* John Mills Cockell Concert	*oct 4* Sha-Na-Na	*oct 4* Bruce Colburn	*nov 13* Globetrotters	for correct information contact the Federation Office(ext2358)	Info supplied by Cindy Harris and altered by mathNEWS.

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? INSPIRATION ?

mathNEWS invited several persons here at the university to submit words of welcome (and inspiration?) for this special edition. What follows are submissions from Dr. B. C. Matthews (U of W President), W. F. Forbes (Dean of Mathematics), Andrew Telegdi (President, Federation of Students), and E. P. Whelan (Assistant to Programme Administrator, Co-operative Mathematics).

one prez writes

In this special orientation issue of mathNEWS, I am pleased to extend a sincere word of "Welcome to Waterloo".

Your first days as a freshman at Waterloo will no doubt be confusing and certainly busy. But very soon you will be settled in your living quarters, have completed your registration and will settle into the routine of attending classes and private study.

I hope you will make full use of all that the University has to offer both in the classroom and in extra-curricular activity. In both areas of activity much depends on you as an individual.

Our faculty members in Mathematics are highly qualified and have a sincere interest in you as a student. It is up to you as a student to make full use of them. Do not hesitate to seek out their advice and assistance.

I congratulate you too on your choice of study. To a remarkable degree, mathematics has become a central discipline in our society. Automation and the techniques of manipulation of data can, quite rightly, be recognized as one of the major developments of the past two decades.

It is certain that the application of mathematics in every aspect of our daily lives will intensify. As graduates of Waterloo in the next three or four years, you will be prepared to play a significant role as mathematicians through the remainder of this Century and beyond.

To each of you I say a sincere "Welcome to Waterloo".

B.C. Matthews

words from another prez

As president of the Federation of Students, I would like to take this opportunity to welcome you to the University of Waterloo.

The coming years will no doubt be a challenge. The amount of growth that you will experience will depend on the degree you are going to be involved in the life of the university.

The university environment can be one of enlightenment or stagnation. I urge you to examine with a critical view your surroundings. Appreciate what is good at the university, and try to change its flaws.

The Federation of Students is charged with the task of protecting the interests of all the students at the University of Waterloo. You can be as active or as passive in the Federation of Students as you want to be.

The sole criterion for a functioning Federation of Students is student involvement. The Federation needs the involvement of first year students. If you want to be involved, or if you want to discover the various areas of activity of the Federation of Students, feel free to come in and browse around. Remember the Federation is you!

Orientation, beginning on September 3rd, will give you the opportunity to tune into your new environment. Be inquisitive and involved.

If you have the opportunity, please drop by and see me. The Federation of Students' office is located in the Campus Centre, Room 235.
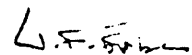
Andrew P. Telegdi

thoughts from the dean

I am most pleased to accept mathNEWS' invitation to say a word of welcome in this special edition. During the first confusing year, you will find mathNEWS a helpful way to keep up with the happenings around the Faculty.

Please feel assured that, despite the bureaucratic endurance test of registration, you are most welcome in the Faculty of Mathematics. We try hard to provide an environment where all Faculty members, students and professors alike, can share common interests and goals, and we hope also that you will share our pride in belonging to this Faculty.

Deans and the like are strong on platitudes and advice and there will be more of the same when we all meet together on Thursday, September 12th at 3:30 p.m. I hope you will be able to find your way there (instructions will be given) so that, at least, you can meet some of the people you will be dealing with. I also hope that you are in the process of learning more of what it means to be at University and that you are liking it. In the words of the limerick:

"There was a young lady from Kent
Who said that she knew what it meant
When men took her to dine, gave her flowers and wine,
She knew what it meant - but she went."

Anyway, I hope that you will show similar initiative, creativity and adaptability to the requirements of University life. Good luck and, again, welcome.

W.F. Forbes

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and, co-ordination

This fall there will be approximately 850 freshman mathematics students on campus. *About 500 of these new students will be enrolled in the co-operative program and will have even more demands made on their time than will those students who are in the regular program.

These extra demands on the time of co-op students will be a result of the following: arranging a freshman interview with a co-ordinator during the first few days on campus, going to that interview, attending an orientation session, picking up employment interview cards, reading job postings, attending up to 15 employment interviews, and reporting on a specific day to find out what employment they obtained.

As a result of spending this extra time co-op students will obtain positions with chartered accountancy firms, insurance firms, federal and provincial governments, computer manufacturers, computer service companies, colleges and universities, steel, oil, chemical, auto, forest products and construction companies ... etc.

If the past few terms can be used as indicators then any student who is seriously interested in finding employment will do so. During those past few terms there were unfilled positions in computer operations, programming and business administration areas.

During the students' freshman interviews they will be assigned a co-ordinator for the first term and he will be available to answer any questions they may have. If the co-ordinator is off-campus, visiting students or employers, when the problem comes up, the student may contact either Bruce McCallum or Eric Whelan in Co-ordination and they will fill in for the co-ordinator in his absence.

Another source of information about co-op, for the freshman, would be any member of the Student Advisory Council to the Co-ordination Department.

E. P. Whelan

*The enrolment figures quoted by Mr. Whelan conflict somewhat with those used on page 1. The front page enrolment statistics are projected figures provided for mathNEWS by the Registrar's Office late in July.

Welcome to the masthead....its rather small this issue because we had 15 pages and decided to produce 14 instead of 16...so with a deletion here and there we crammed everything together... sorry about your article Cindy its on page 15....its now 3am on the 7th day of getting this mN together and its about time I took a nap.....some odds and ends that still remain>>>>>the cost of this issue will be about $160 with about $2600 being spend in 1973-74 producing 27 issues.. ...about 20% of 1st year students dropout or fail with another 10% being put on probation after one year....a nice cheery thought for you....special thanks to 'MARK SHIELDS' for his set of mathNEWS(a complete set) which we have placed in our archives.

Thanks goes out to the many people who helped with this issue...those who wrote articles..... those who typed and corrected...those who clipped and taped and proofread....our staff at one time or another were: DAVE BROWN; MARK SHIELDS; CATHY POTTER; INGRID SPLETTSTOESSER(see you in the winter); RANDALL McDOUGALL(you're starting to repeat); the phantom & the phantomess(gosh); ALAN(hope highschool goes nicely in the fall)FOSTER; LLOYD A GOULDING(one of our rookies, who came to recover from an algerbra exam); PAUL LEAR(he wants your password); DON HALL (who after working on one issue of mN got promoted to editor by Co-ordination); PETE RAYNHAM(who stayed until we got a pizza); JOHN PEEBLES(who is now leaving Waterloo...mN will miss you); and last(definitely last!) DENNIS MULLIN..

**time sharing off at

Goodnite and good luck.
3.570 on 08/01/74