



# Centre for Teaching Mathematics News

Issue 12  
www.tech.plym.ac.uk/maths/CTMHOME/CTM.HTML



## Welcome

Welcome to the Summer 2004 edition of the CTM News. We publish this newsletter every term and distribute it to schools, colleges and interested people. If you are reading somebody else's copy please contact the Centre secretary to be added to the mailing list. Also if you are moving schools and would like to continue receiving the newsletter please send us details of your new school. The newsletter will contain information on the staff and activities of the CTM. Each issue will contain a teaching resource which might be a graphic calculator activity, a problem solving activity or a practical mechanics problem. This term we have a photocopiable resource for all ages – the 24 challenge – can you make the number 24 out of the four numbers given, and a resource for graphic calculators.

## The Centre for Teaching Mathematics

The CTM is an inter-faculty group of mathematics educators based at the University of Plymouth within the Mathematics Department and the Education Faculty at Exmouth plus associate members.

The aims of the Centre are:

**C**reative Resources and Research

**T**raining for Teachers

**M**athematics Enrichment for Pupils

## Contacting Us

Members of the CTM can be contacted via the Secretary:

Julie Tombs

Centre for Teaching Mathematics

School of Mathematics and Statistics

University of Plymouth

Plymouth

Devon

PL4 8AA

Tel/fax 01752 232772

Email [jtombs@plymouth.ac.uk](mailto:jtombs@plymouth.ac.uk)

## Continuing Professional Development

At the time of going to print, our Summer CPD courses are well under way. This year we are running courses on

- CAS, Modelling and Investigations in International Baccalaureate Mathematics
- Decision & Discrete Maths 1
- AS Pure Mathematics
- A2 Pure Mathematics
- KS3/4 Graphics Calculators
- A Level Mechanics 1
- AS/A2 Graphics Calculators

We aim to run similar course again next year at Plymouth and also at a number of venues throughout the country. One date that has been set is:

**26<sup>th</sup> November 2004 – Central London:** Teaching and Learning A Level Mathematics with a Graphic Calculator.

If you would like details of this course please contact Julie at the address on the left.

We are also available to come to your schools or group of schools to run courses. For details and costs please contact Jenny Sharp on 01752 232771 or preferably by email: [jsharp@plymouth.ac.uk](mailto:jsharp@plymouth.ac.uk)

## A level Revision Days

The Centre has over the last few years run revision days for A level Modules. Students are guided through the syllabus topic by topic, provided with a pack of resources to help their revision and given lots of helpful hints for examination success.

We are going to continue this next year with the new syllabus.

There will be revision days in Plymouth and London at Christmas and Easter. If you would a revision day in your area then please contact Ted Graham on 01752 232773 or by email: [egraham@plymouth.ac.uk](mailto:egraham@plymouth.ac.uk)

## Talks for Schools

The School of Mathematics and Statistics at the University of Plymouth is happy to provide speakers on a wide range of topics to increase interest in our subjects. Each talk lasts for about an hour. There is no charge to the school.

Unless otherwise stated, these talks are generally accessible for GCSE and A-level students. Further details can be found at [ww.plymouth.ac.uk/maths](http://ww.plymouth.ac.uk/maths)

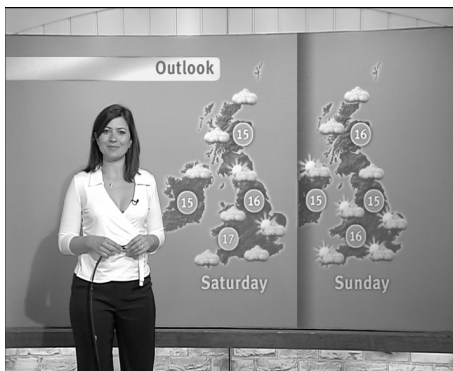
Talks currently available include:

- Mathematics and Statistics Degrees and Careers
- Why Take A-Level Maths? (for Year 11)
- Modelling in Mathematics A-Level
- Coincidences and Statistics
- The Statistics of Medical Trials
- Probability and Risks
- Making Money with Mathematics: how secure is the internet?
- Enigma: the theorem that won the war
- Magnetic Recording: mathematics in small bytes
- Sticky Liquids – Science with Bubbles (for Key Stage 2)
- Expecting the Unexpected (Concepts in Mechanics)
- 100 Years of Quantum Theory
- What's the Matter with Antimatter?
- Quarks: the building blocks of matter
- Why everyone needs to know at least a little numerical analysis: or 'Maths Book + Computer = Wrong Answer!'
- Is Mathematics Invented or Discovered? (for Year 10)

Unless otherwise stated, these talks are generally accessible for GCSE and A-level students. Further details can be found at [ww.plymouth.ac.uk/maths](http://ww.plymouth.ac.uk/maths)

If you would like to arrange a talk, please contact Dr Martin Lavelle,  
[mlavelle@plymouth.ac.uk](mailto:mlavelle@plymouth.ac.uk)  
Tel: 01752 232729,  
fax: 01752 232780

## What you can do with a Maths Degree Clare Nasir – Weather Forecaster



Born and raised in Milton Keynes in 1970, I left school with A levels in Geography, History and Maths and

achieved a place at Plymouth University in 1989. The course was a Combined Honours degree with major in Maths but also included Oceanography, Meteorology and Astronomy. This was a perfect combination for me because of my keen interest in all subjects. By year two I specialised in Maths, taking mainly applied mathematical options. I immensely enjoyed the course, the teaching was to a very high standard and the subject matter itself varied enough to keep my options open afterwards. I went on to complete a Masters degree in Applied Marine Sciences, sponsored by NERC.

Applying for a job as a weather forecaster at the Met Office I found myself well qualified. My degree thesis in atmospheric dynamics was probably the reason why I was initially short-listed for the job, although the job criteria included Maths or physics degree and a Masters in an applied science.

After an intensive 5 month residential Met Office course in meteorology I worked for two years at London Weather Centre as a forecaster and media broadcaster on radio. I then took up a position at Norwich weather centre with similar duties as well as a part time role as weather presenter on Anglia TV.

In 1999 I returned to London to present on Carlton TV. In 2000 I joined the GMTV team as weather presenter and producer where part of my duties involve all weather output as well as other science related stories. The broad basis of my degree and masters has held me in good stead for this position. I do miss the University of Plymouth which were some of the best days of my life.

## Plymouth Based Research into Key Stage 2 / Key Stage 3 Transition - Overall Findings

Through a Leading Edge Schools project with Devonport High School for Girls and Lipson Community College, funding was provided for research into the issues involved in the transition of Plymouth pupils from KS2 to KS3 Mathematics to be explored. The research took two forms:

1. **‘Mathematics KS2/KS3 Transition Questionnaire’** – This was issued in early November 2003 to the 18 Plymouth Secondary Schools. Returns were received from 13 schools, having been completed by senior members of staff within Mathematics departments. The following questions were looked at with findings in boxes:

a. How successful were the ‘Transition Units’? (These were booklets completed by primary school pupils in June 2003 and forwarded to secondary schools ready for a follow up to take place in September 2003)

Only 33% of schools felt these were successful. The most successful elements (75% approval) were the ‘Transition Calculations’ and the pupil statement, ‘My next Target is.....’

b. What were the main obstacles to the success of the ‘Transition Units’?

- Children’s transition exercise books failed to arrive on time (67% of cases)
- Children had completed tasks to different degrees (63% considered this a problem)
- Insufficient cross phase staff visits (62% of cases)
- The activities were insufficiently engaging (50% found this an obstacle)

c. What are the criteria for setting in Year 7?

- 76% of schools set by ability in Year 7. A combination of the following criteria are used:
- Year 6 SAT levels (sometimes raw scores) (85%)
  - Year 6 Teacher Assessment Levels (62%)
  - Internal assessments eg. CATS, end of unit assessments (46%)

d. What pupil data is transferred from KS2 to KS3 and what is used/needed ?

Secondary school mathematics departments in receipt of data for most or all children:

- Year 6 SAT levels (92%)
- Year 6 TA levels (83%)
- Year 6 SAT scores out of 100 (72%)
- Record of Achievement Folders (12%)
- Sufficient details of special needs (81%)
- Year 6 Key Objectives (10 %)

Year 6 SAT Levels, Year 6 SAT raw scores and Year 6 Teacher Assessments are the most relied upon by KS3 staff. Year 6 ‘Key Objective’ records which detail individual strengths and weaknesses are generally seen to be more detailed than needed.

2. **‘Pupil Questionnaire’** – Also issued in November 2003, these were completed by 362 Year 7 pupils and came from the same 13 schools. The following questions were looked at with findings in boxes:

a. How did children’s attitude towards Mathematics change post transition ?

The figures in Table 1 suggest that Plymouth Year 7 pupils consider their attitude towards Maths to be more positive in secondary school than when in primary school.

Table 1 - Responses from 362 Plymouth Year 7 pupils shown as percentages. (SD – Strongly Disagree, D – Disagree, A – Agree, SA – Strongly Agree)

	SD	D	A	SA
I liked Maths at my primary school	13	22	53	12
I like Maths at my secondary school	5	16	53	27
I felt confident during Maths lessons at my primary school	6	13	50	31
I feel confident during Maths lessons at my secondary school	2	9	64	26
I was good at Maths at my primary school	6	11	55	28
I am good at Maths at my secondary school	3	13	65	18
Maths was important to me at my primary school	12	26	41	21
Maths is important to me in my secondary school	3	15	50	31

b. Did children perceive a continuity in their learning ?

The figures in tables 2 and 3 suggest that Plymouth Year 7 pupils consider more of their Maths lessons to be at the right level in secondary school than when they were in primary school. The tables also indicate that repetition of work from KS2 to KS3 is generally helpful although approximately 1/3 of pupils consider there to be too much repetition.

Table 2 - Responses from 362 Plymouth Year 7 pupils shown as percentages. (N – Never, NO – Not often, O – Often, A – Always)

	N	NO	O	A
Were your Maths lessons at the right level for you at your primary school?	8	13	39	41
Are your Maths lessons at the right level for you at your secondary school?	1	6	44	49
In secondary school, do you repeat work that you have already covered at primary school?	4	35	49	12

Table 3 - Responses from 362 Plymouth Year 7 pupils shown as percentages

	SD	D	A	SA
I find it helpful to repeat work in Year 7 that I have already covered in primary school.	13	22	53	12
So far in secondary school, too much time has been spent repeating work that I can already do.	15	53	24	9
I am learning new things during Maths lessons in school	2	7	55	36

c. How were anxiety levels affected by transition ?

The figures in Table 4 suggest that fewer Plymouth Year 7 pupils consider themselves to be worried about Maths in secondary school than when in primary school. They further suggest that, prior to transfer, about 1/2 the pupils worried about the Maths that they were going to do in Year 7 although these worries quickly subsided for most after transfer.

Table 4 - Responses from 362 Plymouth Year 7 pupils shown as percentages

	SD	D	A	SA
I worried about Maths at my primary school	43	39	14	5
Before coming to secondary school, I was worried about the Maths that I was going to do in Year 7	17	32	30	22
I worry about Maths now that I am in Year 7	44	42	10	5

Further details regarding this research may be obtained upon request from Tim Randell , Lipson Community College, Bernice Terrace, Plymouth, Devon PL4 9PG e-mail: trandell@lipson.plymouth.sch.uk

### The Tavistock Transition Project

I have been involved in a project to aid transition between Primary and Secondary school in the Tavistock area of Devon. For the past three years Tavistock Community College invited all the feeder primaries to send up to five Year 6 students who were interested in mathematics. There were four days through the Autumn and Spring Term, each a month or so apart. The sessions ran from 9:30 to 12:00. This gave the primaries time to get the children from the school to the college and then back in time for lunch.

Each session was devoted to an area of mathematics that would enrich and compliment their school mathematics. For example we do proof – why when you add two even numbers do you always get an even number for example and geometry – can we prove that the internal angles of a triangle add up to 180°.

The session is always in a ‘nice’ classroom at the College to give a good impression and as many of the mathematics teachers pop in throughout the morning to see what is going on. The students get a positive feeling about their new school and the teachers are aware of their abilities.

If you would like more details about this type of initiative in your school then please contact me

**Jenny Sharp**

jsharp@plymouth.ac.uk

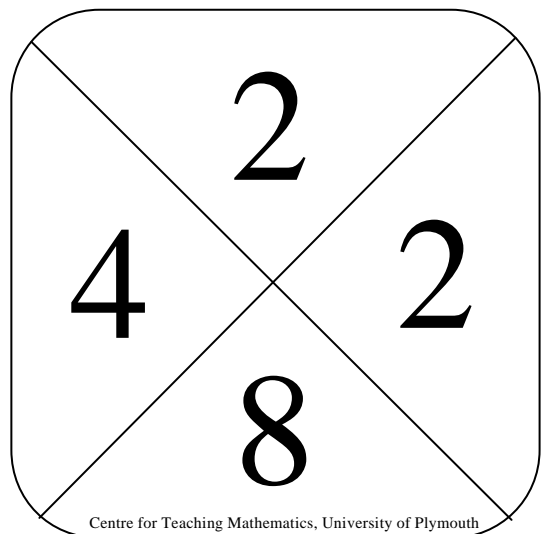
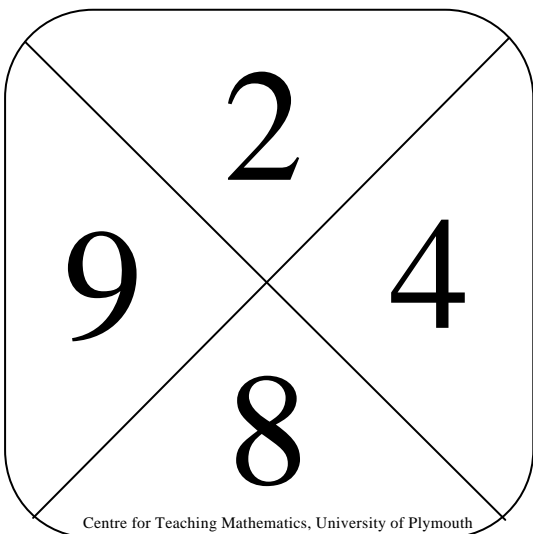
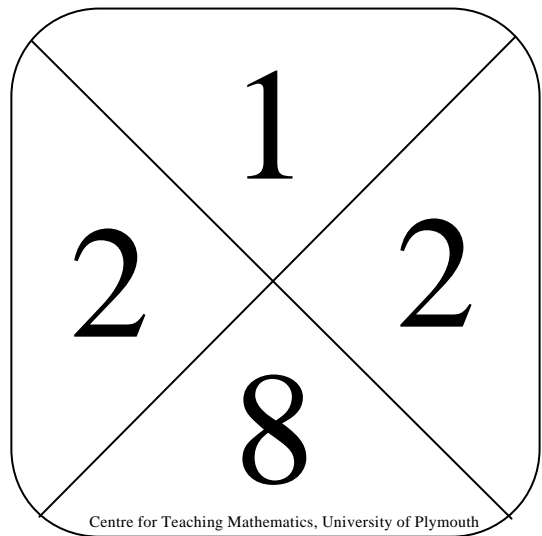
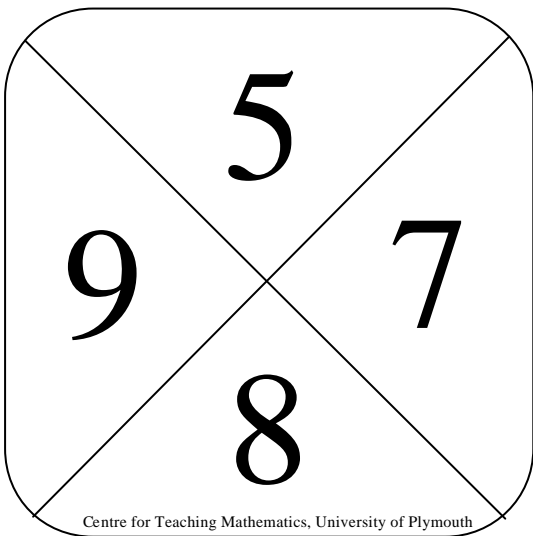
# The 24 Challenge

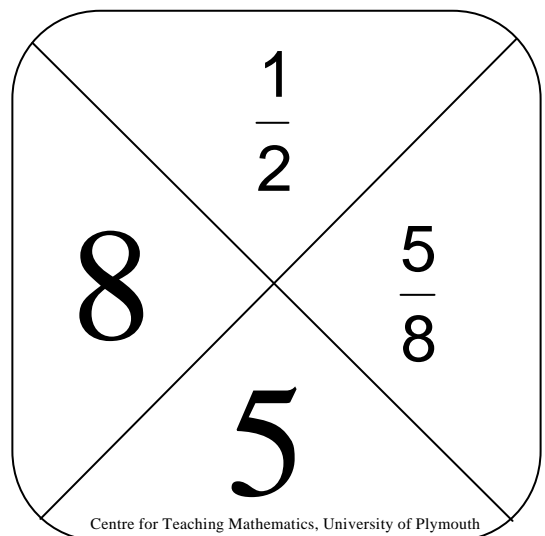
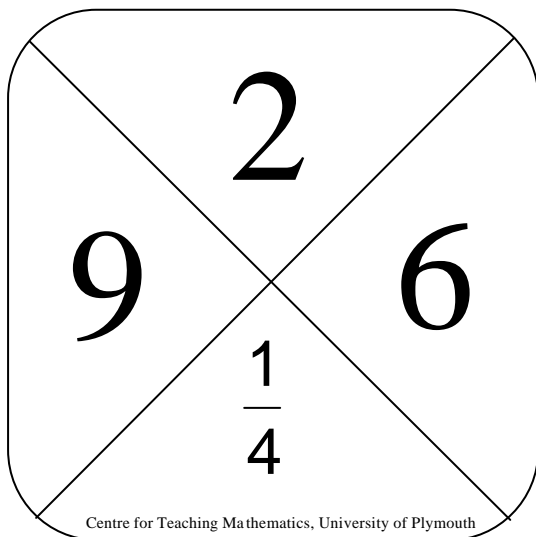
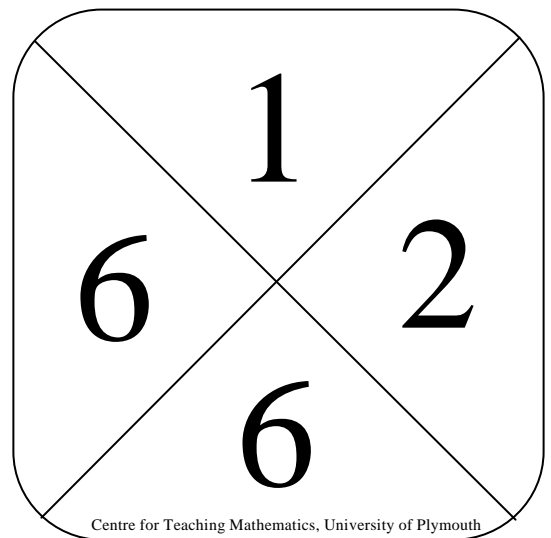
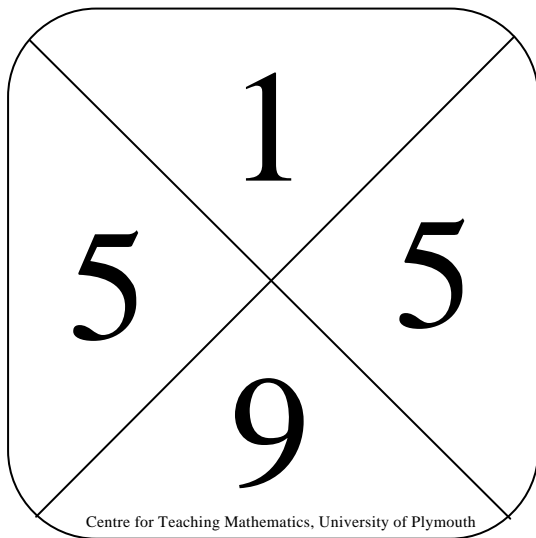
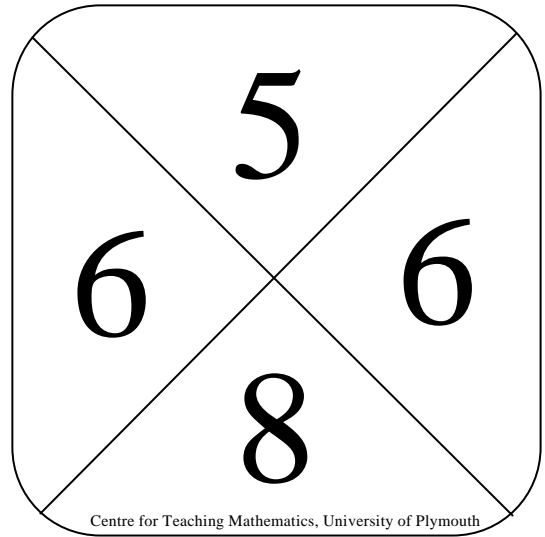
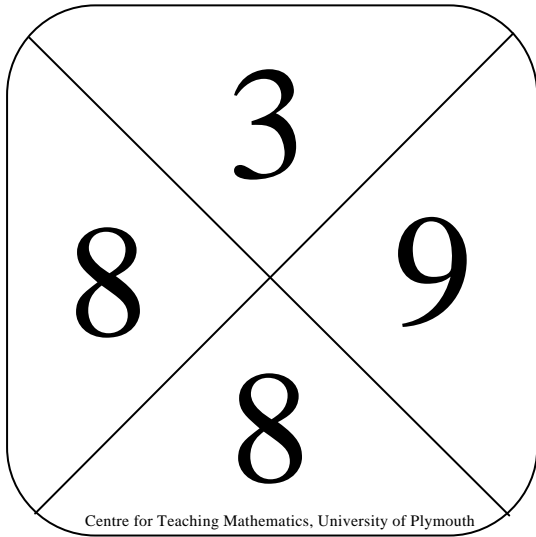
We have used the 24 challenge with students from Primary through to VIth form as a way of getting the brain going – ideal for the mental starter! 24 is a great number to work with because it has a large number of factors. We will be publishing 10 cards an issue, you can photocopy them onto card for students to use individually or in pairs or onto transparency to use with an OHP for a whole class activity.

The rules are simple:

Make the number 24 by:

- Using all four numbers once and only once
- Using the four operations  $+$ ,  $-$ ,  $\times$  and  $\div$





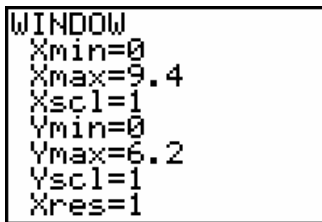
# Co-ordinates on a Graphic Calculator

Although this activity is based on the TI-83 other graphic calculators can do similar things. It is an activity referred to in the KS3 National Strategy for Mathematics document.

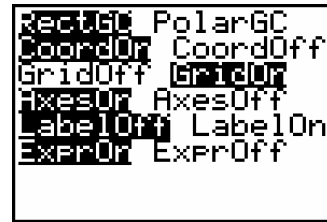
The TI-83 can draw straight lines and circles. For straight lines you need to tell it the starting co-ordinate and the end co-ordinate. The command `Line(0,2,3,6)` will draw a line starting at the point (0,2) and ending at the point (3,6). For circles you need to tell it the co-ordinates of the centre of the circle and the radius of the circle. The command `Circle(0,2,1)` will draw a circle with its centre at (0,2) and it will have a radius 1.

The [WINDOW] needs to be set up as shown.

This ensures that circles come out as circles



The [FORMAT] needs to be as shown.

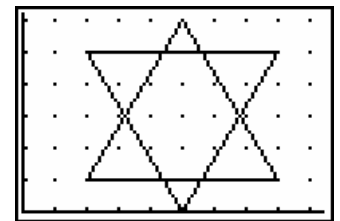


Make sure that there is nothing in [Y=] and that any PLOTS are turned off.

## To draw a star

The first task is to write down the coordinates of the six points on the star.

.....  
 .....

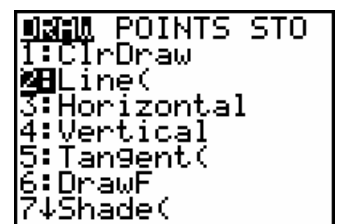


The next step is to write down the commands for the six lines that the star needs i.e. `Line(*,*,*,*)`

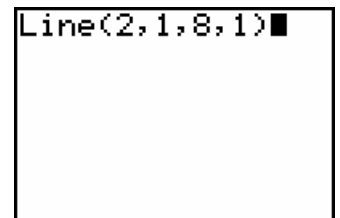
.....  
 .....

Now we can draw our star. You need to be in the Home screen to write the commands which are in [DRAW].

Choose 2:Line( and press [ENTER]

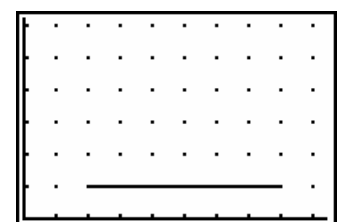


This command should now be on you home screen. Enter the starting and finishing coordinates of your first line.



Press [ENTER] and the line should appear.

You need to get back to the Home screen to get the command for the next line so press [QUIT]. Enter the command for the second line and press [ENTER], your line should appear. Continue until you have your star.

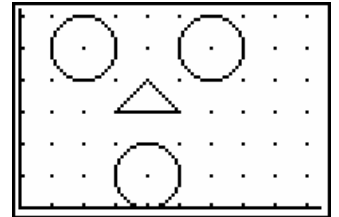


If you make a mistake you need to clear the whole picture and start again! Use ClrDraw from [DRAW]  
 You can save your pictures. [DRAW], across to STO, choose StorePic and give it a number between 0  
 and 9. Recall in a similar way.

## Drawing a Face

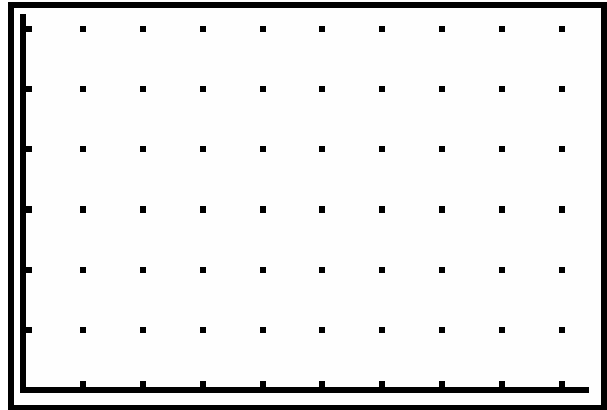
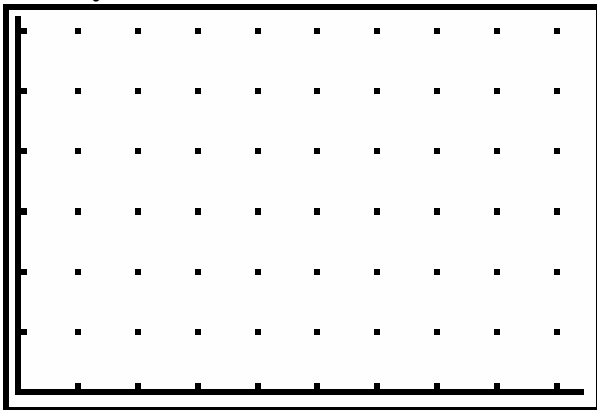
Delete your star: [Draw], ClrDraw.

Now list the commands for the face: Remember the Circle needs the centre  
 coordinate and the radius



.....  
 .....  
 .....

**Create your own!**



## Students pictures

