



UNIVERSITY OF  
CAMBRIDGE

Faculty of Mathematics

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# SUPERVISION IN MATHEMATICS

This guide is intended for anyone planning to give undergraduate supervisions in mathematics.

All the documentation is available on the WWW  
(<http://www.maths.cam.ac.uk/>).

October 5, 2005

# 1 Introduction

Supervision is the word used in Cambridge<sup>1</sup> to describe small-scale teaching. In mathematics, the typical supervision consists of a supervisor — normally a college or university lecturer, a research worker in one of the university departments (not always the mathematics departments), or a research student — going over mathematical problems with a pair of students. Sometimes, if there is a shortage of supervisors, there may be more than two students in the group. Sometimes there may be just one student, but colleges (who have to foot the bill) do not like this because it is expensive.

Supervisions are arranged by colleges, acting individually or in groups, and the responsibility for providing supervisions lies with the Director of Studies in mathematics in each college. The general aims of a supervision are to explain and amplify the material given in the lectures and to prepare students for the Tripos Examinations.

Most colleges expect their students to receive four supervisions for a lecture course of 24 lectures and three supervisions for a 16-lecture course, plus (probably) a revision supervision near the examinations. There are also a few 12-lecture courses (two supervisions) and one 8-lecture course (one supervision).

There is no one correct way of supervising and there is no one set of arrangements which is common to all colleges and to all lecture courses. You should bear this in mind when reading the information and advice given below.

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<sup>1</sup>Elsewhere, supervisions might be called tutorials.

## 2 Training

The university Academic Staff Development program includes training sessions for supervisors. There are normally three sessions early in the Michaelmas term. Although they are not subject specific, they can be very useful. Remember that students are entitled to effective and well thought out supervisions. Information can be obtained from the web site [www.cam.ac.uk/cambUniv/AcadStaff](http://www.cam.ac.uk/cambUniv/AcadStaff) or by telephone (32267) or e-mail ([staff.development@admin.cam.ac.uk](mailto:staff.development@admin.cam.ac.uk)).

The Faculty, in conjunction with the Staff Development Office, is running two (identical) sessions for new supervisors:

2 pm on the first Thursday of term,  
MR4, Centre for Mathematical Sciences.

2 pm on the following Tuesday,  
MR4, Centre for Mathematical Sciences.

These sessions will last three hours and are intended primarily new supervisors **but** don't think that you are experienced just because you have been on the receiving end of Cambridge supervisions. For further information, contact the Faculty Office: [faculty@maths.cam.ac.uk](mailto:faculty@maths.cam.ac.uk).

ANYONE PLANNING TO SUPERVISE SHOULD ATTEND ONE OF THESE SESSIONS: STUDENTS HAVE A RIGHT TO EXPECT TRAINED TEACHERS. NOTE THAT HAVING BEEN SUPERVISED YOURSELF IS NOT SUFFICIENT TRAINING

### 3 Aims and general advice

The aims of the supervision system include the following:

- (a) maintaining interest and enthusiasm for the subject;
- (b) giving students the opportunity to ask about aspects of the course that they find difficult, puzzling or fascinating;
- (c) discovering whether students have understood the course material and thought about its wider implications, and helping them to do so;
- (d) ensuring that students are doing an appropriate amount of work and that their efforts are suitably directed;
- (e) monitoring students' progress and reporting back to the director of studies when necessary;
- (f) encouraging students to develop a measure of personal responsibility for their education.

Note that supervisions are not meant to be supplementary lectures: you should encourage students to participate as much as possible. Some students will sit through your supervisions like puddings if you let them, usually because they are too embarrassed to admit that they do not know what you are talking about. This is not good use of supervision time. Great patience, sympathy and encouragement is required; ask very easy questions to give them confidence and try to point out some virtue in their response even if it is completely absurd. Do not be afraid of prolonged pauses in response to questions. You will soon find out that while some supervisions are immensely enjoyable, others can be like breaking stones.

An important function of supervisions is to give students confidence and encouragement: many of our students underestimate their abilities. First year students in particular are often unable to judge how they are doing. Try to be as relaxed and friendly as possible, remembering that a tense atmosphere is not conducive to learning.

You may find it helpful to see what advice is given to the students on the receiving end of your supervisions: if so, take a look at *Study Skills in Mathematics* available from the Faculty Office or on [www.maths.cam.ac.uk/undergrad/inductionday/studyskills](http://www.maths.cam.ac.uk/undergrad/inductionday/studyskills).

## 4 Why supervise?

Here are some possible reasons why you might consider supervising.

*The money.*

This is not a bad reason but you would do well to calculate how much you expect to earn before you start. You will find that the sum involved is useful but no more than that.

*It will look good on my CV.*

This is not usually a good reason. The number of openings for which having supervised at Cambridge is a strong positive recommendation is non-zero but small.

*My college or my research supervisor expects me to.*

This is a bad reason. If you are a research student, your college and your research supervisor want you to do good research. Everything else is secondary.

*It is a good introduction to teaching.*

This is an excellent reason. Like most skills teaching is mainly learnt by doing and where better to start than with a small group of able and motivated students? In supervisions you can actually see the effects of your teaching and learn both what teaching can achieve and what it can not.

*The best way of learning something is to teach it.*

Undoubtedly true, but you must remember that you will be improving your general mathematical culture rather than learning things which are directly useful in your research.

*It is a change.*

Research is a lonely occupation in which long periods may pass without apparent progress. Supervising provides social contact and immediate rewards as you see your teaching having its effect.

*It provides a way of putting back into the system something of what you have gained from it.*

Not a bad reason, particularly if you were a Cambridge undergraduate; but not a very powerful motivation.

Whatever your reason for starting supervising you should not continue with it if you find that you do not enjoy it or that it takes

up too much time. In the first case you are cheating your students, in the second you are cheating yourself. Remember that unless you are a teaching fellow of a college (or have some similar appointment) you have *no duty* to supervise for your college or for anybody else. If you do not wish to supervise just say so. Nobody will hold it against you. In particular it is generally considered that Part III students should be so busy following this gruelling and testing course that they should have no time to supervise others.

If you are a Part III student and are very sure that you want to make time to supervise, then there are probably opportunities; however, you should tell the Director of Studies involved that you will almost certainly not be able to give revision supervisions in the Easter term — preparation for revision supervisions can be exceptionally time-consuming.

## 5 Preliminary organisation

### Finding supervision work

Supervisions are arranged very early in the term (or often before the beginning) so, if you wish to supervise, you should start looking for supervision work well before lectures start. If you are a member of a college that takes undergraduates it is considered courteous to offer your services first to the Director of Studies at your own college. If they cannot offer you anything directly they may pass your name on to an organiser of a Part II ‘circus’. Even if you belong to a graduate college it may be best to start with with your own Director of Studies, if such a person exists, since he or she may well have good connections with an undergraduate college. If this does not work, your Research Supervisor may be able to help (though such assistance is not part of their duties towards you). Both Departments maintain notice boards for advertising demands for, and offers of, supervision work<sup>2</sup>.

### How many hours?

Three hours of supervision use up one afternoon a week. Most people will find that their main work does not suffer, and may, indeed, benefit from one afternoon a week doing something different. Six hours of supervision use up two afternoons a week. If afternoon seminars and morning lectures already eat deeply into your time, this may well be too much, though some people can manage this amount of supervision without their main work suffering. If you find yourself doing more than six hours of supervision a week on a regular basis you are almost certainly doing too much for the health of your research. In addition, many scholarships and awards specifically limit the amount of teaching you may do to six hours a week. The same restriction applies to all students studying for a Cambridge PhD<sup>3</sup>.

There is another way of approaching the matter. Observe that

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<sup>2</sup>Directors of studies in subjects such as Natural Sciences, Engineering and Economics may also be on the lookout for supervisors. Such supervisions are called *service teaching*. This guide applies equally to such teaching.

<sup>3</sup>See BOGS memorandum to Graduate Students.

the amount of preparation required is much the same whether you give one or three supervisions. There are thus substantial economies of scale in giving several supervisions on the the same exercises but, as the number of supervisions increases, you will become aware of the diseconomies of boredom and staleness ('Have I already told them that, or was it the previous pair?'). Most supervisors find that if they give such a series of supervisions they are happiest with the second or third supervision and that their satisfaction with their own performance then tails off.

## **Which course?**

Many Directors of Studies prefer, if possible, to use experienced supervisors for the general first and second year supervisions where bad supervising will do most harm. Frequently the director of studies will do mainly first and second year supervisions in order to get to know their undergraduates. Whenever possible, also, they use members of their own college who will, in theory, and usually in practice, feel personally involved in the success of their college's candidates. On the other hand, few, if any, colleges can fill their third year supervision requirements from their own resources and many specialist subjects have only a limited pool of potential supervisors. Thus the majority of supervisors start by taking on specialist Part II or Part III supervising. In many ways, this is the easiest work for new supervisors: the material is fresh in their minds; the students are more used to handling supervisors; and there are fewer of the unfamiliar and difficult 'how best to teach this material' sort of problems.

If you are a Cambridge graduate, you are probably familiar with the material in each course. Otherwise, you can find the contents of each undergraduate mathematics course (closely specified) in schedules which bear the lapidary phrase 'These schedules are minimal for lecturing and maximal for examining'. Copies of the schedules are given to each undergraduate and further copies are available from the Faculty Office in CMS; they are available on the faculty web site ([www.maths.cam.ac.uk/undergrad/schedules](http://www.maths.cam.ac.uk/undergrad/schedules)) in pdf format. Once a course has been running for a couple of years the Tripos questions will help flesh out the Schedules and should also be consulted.

Copies of the last few Tripos papers are available on the Web Site <http://www.maths.cam.ac.uk/ppa/>. Copies of the last 30 years' Tripos papers are held in the library. If you are in doubt as to how the lecturer intends to cover part of the course ask the lecturer or consult the lecture notes of one of your better students.<sup>4</sup>

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<sup>4</sup>You should not expect to get a reliable answer if you ask a student directly whether such and such has been covered in the lectures. You have only to think what you remember from last week's seminar to understand why this is.

## 6 The supervision

### Preparation

It is of course essential to know that material thoroughly before you give the supervision. This means working through the problems<sup>5</sup> and may also mean reading up the theory, since your students may want you to explain difficult bits of their lecture notes. Do not be discouraged if something proves difficult for you; it is perfectly acceptable to seek help from other supervisors or from the lecturer.

### Setting work

All lecturers hand out problem sheets. These are supposed to relate to their own treatment of the material.<sup>6</sup> Unless you are particularly confident of the course as it is given by that particular lecturer, you will probably want to set work from these sheets. In an ideal world, the number of sheets per course would match the number of supervisions generally allowed by colleges for a course of this length and the sheets would consist of basic questions followed by some supplementary questions intended as extras for the good or well-prepared students. However, even the world of Cambridge mathematics is not always ideal, so you should try to get sight of the sheets before you set the work in case it is necessary to pick a selection of questions. In any case, unless you are a genius, you will want to work through the material thoroughly yourself before the supervision. Some lecturers provide written guidance for supervisors, to indicate how some of the problems on their examples sheets should be tackled to be consistent with the approach of the lecture course or what the significance of a problem is in the context of the lecture course. **In any case, do not hesitate to approach the lecturer: he or she will often be glad to have the feedback.**

All examples sheets should be viewable on and downloadable from the departmental websites (<http://www.damtp.cam.ac.uk/> and

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<sup>5</sup>Perhaps even producing complete solutions; this is very helpful if you plan to supervise the course again.

<sup>6</sup>So you should not rely on the sheets being the same as last year's.

<http://www.dpmms.cam.ac.uk/>) and should also be available from pigeon holes in the relevant bit of CMS.

For revision supervisions in the Easter term, students usually like to prepare past Tripos questions. It is sensible to select them yourself: it is not safe to assume that last year's questions are suitable. Choose those which are pedagogically valuable, but not pure bookwork. Eight questions is about the right number for a third year course. The solutions to all Tripos questions are available in the faculty offices for inspection by supervisors. These should not be photocopied and handed to students.

## Timing

Most courses are 24 lectures (three/week) or 16 lectures (two/week). Lecturers are supposed to provide four examples sheets for a 24-lecture course and three examples sheets for a 16-lecture course. Since these are likely to be distributed evenly over the course, you should not arrange supervisions before the middle of the third week of lectures for a 24-lecture course and not before the fourth week of lectures for a 16-lecture course. Students find it extremely dispiriting to be asked to do problems on material that they have not yet covered in lectures. Often, it is best to arrange the last supervision for the beginning of the following term, when the students will have had time to learn the material in the last few lectures.

## Supervising

Stephen Leacock (a Canadian economist) described the Oxford method of supervision as follows. (His description dates from 1922 but things change slowly in that university.) 'I understand that the key to this mystery [the Oxford method of education] is found in the operations of a person called the tutor [i.e. supervisor]. It is from him or rather with him, that the students learn all they know: one and all are agreed on that. Yet it is a little odd to know just how he does it. 'We go over to his rooms,' said one student, 'and he just lights his pipe and talks to us.' 'We sit round him,' said another, 'and he simply smokes and goes over our exercises with us.' From this and other

evidence I gather that what an Oxford tutor does is to get a little group of students together and smoke at them. Men who have been systematically smoked at for four years turn into ripe scholars.’

Many arts subjects rely on the pipe-smoking method of supervision (speaking metaphorically of course: nobody smokes in supervisions) but most scientists believe that only non-scientists (if anyone at all) can successfully smoke at students. Generally, in a mathematics supervision, you sit at a desk<sup>7</sup> with your students (preferably two of them, one on either side of you so that they can read what you write) and write out solutions to exercises or explanations of pieces of mathematics on paper (*not* on a blackboard). The students should be persuaded *not* to take notes themselves; they need to leave their minds completely free to concentrate on understanding everything you supervisor say. At the end of the supervision, the students should take away what you have written and (best) use it to annotate, correct or complete their own supervision work or (second best) file your notes with their own work. It is worth telling them a few times that they should go over the supervision as soon as possible, while it is still fresh in their minds.

What you actually do in the supervision will depend very much on your students. It is a good idea always to start by handing them back their (marked!) work, allowing them a minute or two to look over it. Often, it is worth then asking the students how the lectures are going and whether there are any problems arising from them. This is useful for breaking the ice; and there may not be another opportunity once you get to work on the set problems. With the very best students, the supervision can turn into a general discussion of the subject, but most students are anxious to go over the work they have done in detail, question by question.

For problems which one or both of the students did not manage to complete, unless there are just small points of interest, it is often best to write out the entire solution, explaining the derivation of each line. You should make sure that what you write is not scrappy; the

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<sup>7</sup>One colleague used to sit on a sofa and use a tea-tray on her knees, but most students will be comfortable at a desk. Some (very few) supervisors offer tea/coffee; this is friendly, but neither necessary nor sufficient for a good supervision and can be a great distraction.

students should be able to recognise which question is being answered (write the number on the paper) when they come back to it later and be able to reproduce the entire solution from what you have written.

Generally, students are not interested in your neat and elegant solution (which you may well have learnt from your supervisor, or from some other source); they will accuse you of just performing mathematical tricks. They want to know why you thought of tackling the problem in this way and what features are common to a class of problems.

You should try to use each problem to explore the extent to which they have understood their lecture notes, perhaps working in a bit of the theory in your explanation (or getting them to).

**Remember that showing students how to do problems is not the main purpose of a supervision.** Most students seem to prefer a problem-based learning process. This means using the problem as a tool to illustrate, and enhance the student's understanding of, the theory. The solution is not an end in itself.

## Marking work

You are expected to mark students' work. There is a limit to the amount of time you should spend on marking: it is not realistic to aim to find every single missing sign or arithmetic error (though your students will appreciate it if you do). However, it is important to get a good idea of whether the student has understood the material or merely copied it from the lecture notes, from a book, from a pal, or from the solution you wrote last week for another student. You should write congratulatory comments on the good bits,<sup>8</sup> but you should not be too damning of the bad bits: it sometimes takes as much time and effort to produce poor work as it does good work, in which case, your student might be very upset and discouraged.

It is a very good plan to tell your students to mark in the margin of their work any step they are unsure of. This not only saves your time, but is also very good discipline for them.

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<sup>8</sup>Your students will take much pleasure from the simple comment 'Nice!' on their work; remember that they are only a few years out of school and praise from a Great Mathematician still cuts ice.

Some students like to know whether their attempt at a question, especially a Tripos question for a revision supervision, would have earned them an alpha or a beta. You may be able to judge this for yourself; alternatively, you may find that the model answers kept by the Faculty Office include a marking scheme. As a rule of thumb, and alpha corresponds to  $3/4$  correct and a beta to  $1/2$  correct.

## Supervising women

Only about 20% of undergraduates in mathematics are women, and the percentage declines rapidly at higher levels. This has two obvious consequences. First, some women feel uncomfortable in such a male-dominated environment. Second, there are presumptions on the part of supervisors and lecturers about the ability of women at mathematics; mostly, such presumptions are entirely subconscious.

There is much debate about whether the under-representation of women at the highest levels has cultural or biological origins. This debate is interesting but not relevant to us: our selection procedures mean that our students, irrespective of gender, range in ability from excellent to truly superb.

In most respects, women should be treated the same as men in supervisions (note that this may require conscious effort to overcome subconscious presumptions). But in one respect, supervisors should make a special effort. Because women are in a small minority and because, in general, women tend to enjoy the competitive nature of the Mathematical Tripos less than men, they often lack confidence in comparison with the men. It is very important that supervisors make every effort to build up this confidence.

One report on women in the Mathematical Tripos contains the comment *Cambridge mathematics loses women faster than men [i.e. by transfer to other subjects], and inadequate, insensitive supervision by men is thought to be one of the reasons.*

Here are some comments by women who graduated recently in mathematics:

*It was nice when supervisors said that you'd done stuff right – just a little bit of praise and encouragement. I think so much of this*

*Cambridge thing is just confidence – which is possibly why girls don't do as well.*

*Some supervisors are extremely nice people and not consciously biased at all, but it's noticeable that if one supervisee is a lass and the other is a bloke and they've got different answers, it's the lass's answer that gets checked first.*

*It is very hard to admit that you are having difficulties because no one else seems to and the mathematics fellows always express great surprise if you say that you don't understand something. This is humiliating in supervisions and has put me off speaking out.*

*Often at the beginning of a supervision, the supervisor would say things like 'This one was straightforward. I assume you could do it?' Such comments made it difficult to admit that actually I hadn't been able to do the question. Some supervisors would even laugh when I admitted that I couldn't do a so-called 'easy' question.*

Of course, some of these comments might equally well have been made by male students; and equally, many female students come through the system unscathed. There were many highly complimentary comments in the same report. But we would all do well to consider our own supervisions in the light of the above comments made by our students.

## 7 The first meeting

Having found some supervision work, the first task is to arrange the first supervision. It is possible to make all your supervision arrangements by post or by e-mail, but most supervisors find it easier to have a preliminary meeting to fix supervision times, give arrangements for handing in work, and to set supervision work. Here are some hints concerning these matters.

### Ground rules

It is a very good idea to set out the ground rules for your supervisions straight away. This will save awkwardness later on, for example, if you criticise students for handing in work late and the students are able to say that they didn't know you minded about late work<sup>9</sup>.

Typical ground rules for your supervisees might be:

- turn up on time;
- hand in work on time;
- present work neatly;
- contribute and participate;
- make sure you know the material in the course;
- give advanced notice if you are unable to attend.

Of course, you must have ground rules for yourself. For example:

- turn up on time;
- mark work;
- make sure you know the material in the course;
- give constructive feedback;
- give advanced notice if you are unable to attend.

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<sup>9</sup>In case you are not sure: you do mind.

## **Supervision times**

If you have, say, four supervision pairs a week (or per fortnight) the simplest procedure is to name four times and leave it to the students to choose which pair goes to which supervision. You may believe that students are here to do mathematics, not to play cricket, act or row, but some flexibility in timing is often appropriate and in some cases essential (for example, some women students may be nervous of having to wander about Cambridge after dark).

## **Arrangements for handing in work**

You are expected to mark students' work in advance, so you must set a deadline for handing in work. (If you have an official deadline and a later unofficial deadline you will find, within two or three weeks, that all the work is handed in five minutes before the later deadline. You are therefore well advised to have a single deadline and stick to it.) It is unfair to students to ask them to hand in work more than 24 hours, say, before the supervision and, if you do demand a longer period, the students may forget what they were thinking when they wrote their work. Make sure that the students know where to hand in the work (e.g. 'My pigeonhole at college', 'The pigeonhole marked  $K$  in the DAMTP pigeon holes by the main entrance of CMS'). Remember that CMS is closed after 5.00 and over the weekend. It is a bad plan for the students to send their work to you by college post, which is slow and can be unreliable, or to give it in to your college porters' lodge, since the next post round may not be until the next day.

## **Work for the first supervision**

Many lecturers do not issue the first example sheet until after a week or so has passed. You may be able to get round this by asking the lecturer for a copy of his or her first example sheet or by getting a copy of the first example sheet for the previous year. The main problem (and the reason for the lecturers' delay) is that most courses start slowly and students will not have covered much ground in the first week. Generally, the Director of Studies will want you to give

a fixed number of supervisions (4 per 24-lecture course, normally) so you cannot afford to waste one: you must ensure that the lecturer has covered sufficient material for the first supervision. This usually means arranging the first supervision at the end of the third week of lectures. You may not be able to fit all the supervisions into the same term as the course is given. It is fairly common practice to give the last supervision at the beginning of the following term.

## **New ideas**

You are never too old or experienced to take on ideas for improving supervisions.<sup>10</sup> It is a good plan — probably essential in order to improve the quality of your supervisions — to talk about how you supervise with other supervisors. Although mathematics supervisions are rather different from supervisions in other subjects, you may well find it interesting to talk to supervisors from other departments to see if you can import anything.

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<sup>10</sup>Someone mentioned the other day that he always gives the marked work back to the students before the supervision, even if it is only 10 minutes before, instead of expecting them to try and assimilate it in the first few minutes. This seems to me (STCS) to be an excellent idea, and one that I'm afraid had not occurred to me in 25 years of supervising.

## 8 Supervision reports: CamCORS

You are expected to fill in a supervision report for each student. In October 2002, the old paper system was replaced by an online integrated system which should save you and the college office a great deal of time. It should, for example, mean that you do not have to fill in separate claim forms for each of your students in order to be paid. The new system is called CamCORS (Cambridge Colleges Online Report System) and documentation can be found on <http://camcors.cam.ac.uk/>.

You will need a University Computing Service user ID (this is your cam.ac.uk e-mail address if you have one) and a password. The college or department for whom you are supervising will arrange the ID if you haven't already got one; you can e-mail [camcors-registration@ucs.cam.ac.uk](mailto:camcors-registration@ucs.cam.ac.uk) if you have no password.

**In the new system, supervision reports are intended primarily for students.** Most colleges will allow students to log into CamCORS and see what supervisors have written about them. The reason for this shift of emphasis is partly the Data Protection and Freedom of Information Acts, under which students have the right to see what has been written about them and partly a response to the recent trend towards student-accessible feedback. It is, however, possible to include in your report a passage for the Director of Studies only; and, of course, you can always e-mail the Director of Studies at any time if you, for example, are concerned about the progress of your supervisees.

The most helpful report is one that is specific and encouraging: details of strong or weak points (including presentation of work, punctuality and whether the work is handed in on time) are immeasurably more useful than general comments such as 'Decent work' or 'A bit feeble'. It is always a mistake to try to be funny or clever.

**Remember that even the mildest criticism can be very hurtful.** That should not prevent you from criticising where appropriate, but it is always wrong to make statements such as 'X is not very good at mathematics' or 'X is not a natural mathematician'. Even a comment like 'X does not work hard enough' can be very upsetting to X if he or she thinks she has been working hard but not

making much progress.

You may also be asked to predict an exam class. Your guess is probably as good as anyone else's, but do not fill this box in if you feel uncomfortable about supplying observational data with error bars the width of the sample space.

You should always take the business of writing supervision reports seriously. You should remember that you may well have seen more of the student than the Director of Studies has, so he or she will have to rely on your report. Reports may well be used at a later date as a basis for a reference for the student or, if the student is in difficulties, as evidence either for the appropriate college committee or even a university committee.

Here are some real-life examples:

On the basis of the three examples sheets we have covered, it seems you have a good grasp of the main ideas in this course. I must say I expected you to do a bit better, as it is a C-course, but maybe some of the examples were a bit on the hard side. Anyway, with a thorough revision of the material I am sure you will do well in the exam.

This is quite a difficult course, because of the amount of background understanding required - especially a facility with Vector Calculus, which you still need to acquire. Nevertheless, I thought it went well. The work you handed in was a bit limited, but well thought out. You were a bit reticent in the supervisions (as far as I remember you never had questions to ask); but when prodded in the supervision, you usually said something very sensible. You should take more risks!

I have enjoyed supervisions K. She has shown that she is getting the hang of most of the material involved, and supervisions seem to have provided a valuable opportunity to consolidate understanding. She sometimes has wonderful insights (I especially recall the Riemann sphere discussion), which will serve well in time to come. She should make sure that she practises lots of questions between now and the exams to ensure that she has really got to grips with this material: it forms a foundation for much later work - maybe have a go at the later questions on the sheets and also the whole of sheet 2 (when she was fairly ill).

First class work. Keep it up!

## **9 Feedback**

### **To Directors of Studies**

There is normally no need to tell directors of studies how their students are getting on except via supervision reports. However, many will be glad to know that you are taking an interest. If a student is obviously not doing as much work as he or she should, and particularly if you are worried that the student might not be able to make anything of the examination questions on your course, you should certainly send a message to the director of studies. Early action may well be essential. In particular, if a student fails to turn up for a supervision, giving no explanation, you should alert the director of studies or the college office. (And you can claim your supervision fee as if he or she had turned up.)

### **To lecturers**

Lecturers are lonely souls and will appreciate feedback. This will most likely take the form of (constructive) criticism of the example sheets, which is always useful and is particularly helpful if the lecturer is not supervising the course; it may even lead to improvements in the sheets and the course in future years. Notes, e-mails, or contact in the coffee room will in most cases be warmly welcomed. The lecturer's e-mail address should be on the bottom of each examples sheet.

### **To the author of this document**

Feedback about this document would be much appreciated, whether in the form of suggestions from experienced supervisors and directors of studies, or questions and comments from less experienced supervisors. Please e-mail [s.t.c.siklos@cam.ac.uk](mailto:s.t.c.siklos@cam.ac.uk)