This is my last video in the series of videos, how to develop an application task for specialist mathematics. In this video I will discuss how to develop task related rubrics for the assessment criteria using the published VCAA criteria.

First, I would think about the important aspect of mathematics to be considered in assessment of student work in this application task. Such as: repeated differentiation and integration; recognition of recursive patterns; evaluation of derivatives; and anti-derivatives using a variety of approaches, including the possible use of technology.

Next, I know that the ratios for the outcomes 1, 2 and 3 are 15 to 20 to 15, respectively. So then as you can see on the slide, the outcomes allocated for component 1 are 8, 5 and 3. And for component 2, the outcomes are 4, 9 and 5. And for component 3 are 3, 6 and 7.

And I'll explain how I come up with all those figures there, given the fact that in the first component, it is an introduction of the context through specific cases or examples. It is a hook, helping students to understand and engage in the context for investigation through specific cases or examples. Hence, the mathematics involved and its application should be familiar and routine. Thus, the weighting of outcome 1 in component 1 would be more than that of outcomes 2 and 3. Hence, I had it down 8, 5 and 3.

In the second component, students are required to explore the general features of the context which involved extending and generalising formulation and application introduced in the first component. So that the context is explored in greater breadth and/ or depth. Thus it would typically include more open ended work, with some unfamiliar and non-routine aspects considered. And therefore, you can see outcome 2 in component 2 weights more than that of outcomes 1 and 3. It is now worth 9 marks compared to outcome 1, which is 4, and outcome 3 is 5.

Finally, in the third component, students are required to make use of their technology to analyse or explore the relationship or pattern over a particular feature in some depth. Students must use what they have learnt from the first two components and apply them into this component. So therefore, in this component 3, we can see the marks for outcome 3 weights much more than that of outcomes 1 and 2.

We want students to write mathematically. However, I feel that at senior maths level, we are so passionate about teaching students skills and concepts. We are so eager to pass our knowledge onto them. After all, we are teachers and that's what we do. Actually, I'm sure that students have done some "working mathematically" tasks in the past. So in a way, they would have had some ideas of what is the expectation when they see terminologies such as explore or investigate or discuss.

However, I thought to make it more accessible to students, I will produce a command terms with definitions, and I'm sure this list would not just benefit the EAL students, but every student. So you can see, on the PowerPoint, on this slide I have to included some actions with descriptions, such as discuss. What does discuss mean? It is: offer a considered and balanced review and analysis, including a range of arguments, factors or hypotheses. Explain. What does explain mean, or what do we expect students to explain their work? So basically we want them to give a detailed account including reasons or causes. When we ask them to explore, what they need to undertake a systematic process of discovery. So then they can find out pattern. So then they can come up with a conclusion. And then of course, I include hence, investigate, justified, show that; the list does not stop there. You can include the word such as: construct, deduce, describe, interpret, another one would be like write down. When we ask students to write down what do we expect students to do? Basically just to obtain the answer or answers, usually by extracting information, and there's little or no calculation is required, and working does not need to be shown. So I guess I'm including this page, whether it is before the task beginning or after that would- or during the task as the front page of the task that would be quite useful for students.

Some expectations. What do we expect students to do when it comes to the graphs? Put it down. Explain it to students before they do the application SAC. So for example, when graphs are drawn, sketched or plotted as applicable, what do we want students to show? It can be maximal domain and range identified. Key features such as axis intercepts, asymptotes, stationary points, points of inflections and symmetry identified. So all of those, probably put it somewhere at the beginning of the application task, or as a pre-document before they sit the task, so they know what sort of expectations that we required from them when it comes to graphs.

The units should also be clearly specified and consistently used where appropriate. And of course, correct use of mathematical conventions and notation. Now it comes to the outcome 1 aspect of the task related to criteria. Some of these on here could be found from the VCAA website as well.

For example, in criteria 1, we have appropriate use of mathematical conventions, symbols, and terminologies. We could ask students, we're looking for application of mathematical conventions in graphs and hopefully students can gain some marks. But for those who get three marks, it will be that they've done pretty well. In criteria 2 definition and explanation of key concepts, you could actually include any mark between 0 to 6.

So all of these, actually, are available from the VCAA website, where you are going in and looking for the criteria. So here it is for outcome two. And for outcome three. Okay so, it depends on what we require from the students. Make sure all of this is actually well explained. The students might actually have access to the documents so they know when they're doing things. When they do their work, then they know what we are looking for. I just want to recall what I've just said before. This information can be found from what is called performance criteria. Okay. And that's the extract. I've got it from the VCAA website.

Alternatively, you might want to use a sample assessment record here. So from here, we can allocate a mark. For example, appropriate use of mathematical conventions, symbols and terminologies. Anywhere from one to three marks. Okay.

And for more resources, of course, you can go to the advice for teachers by clicking- click on that advice for teachers section. There are plenty more resources that you can find. And that brings me to the end of this set of videos about how to develop an application task.

I would like to thank you all for watching these videos. I hope that what I have presented would be helpful and useful for you in many ways in developing your own application tasks. Nothing is more satisfying in teaching than seeing our students getting the benefit from what we, as educators, have designed and developed to help accelerate them to the next level. Thank you once again and all the very best. Bye for now.

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