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Message from our Director - Lynne McClure

The number of schools involved in CMEP is growing weekly – we now have over 450 institutions using our resources to some extent – and this is especially pleasing since it is in advance of the official launch of the site which will be in the spring next year. The feedback we get from teachers is very important to us and we are always pleased to hear how the resources stand up to rigorous classroom use.



However, whilst the name 'Cambridge' is synonymous with academic excellence, it can sometimes hamper engagement, especially where an audience perceives an elitist element. The CMEP team is very aware that we have a case to win to convince teachers in the full range of schools and colleges that CMEP resources are appropriate for the full range of A level students. That's especially important now when teachers are planning for the new year.

To that end we have been focusing recently on two aspects: firstly to make sure there are enough resources to help to bridge the GCSE/A level gap, especially for students who are not yet technically fluent. Secondly we are continuing to design tasks which have a low threshold so that they are accessible for all. To support this Lizzie has been working with colleagues in schools on video examples of how tasks can be used across the ability range. The results are fascinating because they show how, presented with a very carefully structured task, students find themselves capable of far more than they had imagined and, through this, gain in confidence and competence. So two important messages – CMEP is for all, and prejudging what students can do is not always in their best interests!

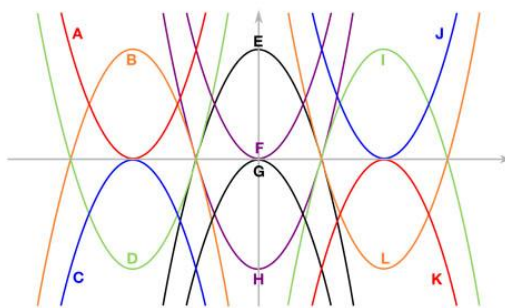
Have a good summer.

Lynne

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Featured resource: Which Parabola?

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Given that two of the parabolas have the equations

$$y = x^2 - 12x + 27$$

and

$$y = -x^2 + 12x - 36,$$

can you find the equations of the other parabolas?

Students can tackle this resource at various stages in their journey through sixth-form mathematics. Drawing on their previous knowledge of quadratic equations, this problem provides students with an opportunity to consider the connections between the graphical and algebraic representations. Instead of giving the equations of some quadratic functions and asking students to sketch the graphs "Which parabola?" gives the graphs and asks them to find the equations. Learners should be encouraged to experiment by changing the equations systematically to discover the effect on the graphs.

You may wish to use this resource as a starting point to discuss transformations and which form of a quadratic is most useful in this respect. Returning to this resource once your students are confident at manipulating all the different forms of quadratics should encourage them to reflect on the approach they used the first time, and their ability to bring new understanding and techniques to the problem.

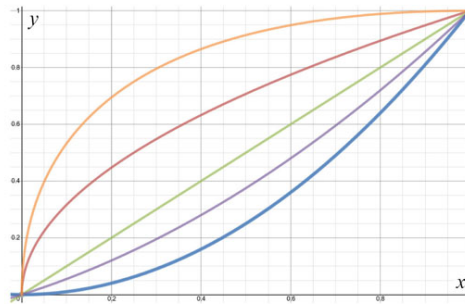
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Teacher Perspective: Using Curve Match and Approaching Asymptotes in the classroom

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The following five functions have been plotted accurately on the axes below.

- $y = \sqrt{x}$
- $y = x^2$
- $y = x$
- $y = \frac{x^2 + x}{2}$
- $y = 2\sqrt{x} - x$



Can you label each curve?

Imagine that you wish to plot a route between $(0, 0)$ and $(1, 1)$. Can you find a function that does this without intersecting any of the existing curves, except at the endpoints?

What other curves can you plot that intersect the existing curves only at the end points?

Sue Southward, from Comberton Village College, shares her experience of using Curve Match and Approaching Asymptotes with a group.

This was the first of four lessons on functions in Edexcel Core 3.

"I started by displaying the Curve match file. I asked them to identify which curves they knew. They started with the ones they were happy about (the straight line and the parabola, and checked them by looking at the co-ordinates. They were happy about $y = \sqrt{x}$, again checking coordinates. The final two they did by elimination. I asked them about any connection between $y = x^2$ and $y = \sqrt{x}$. By looking at pairs of co-ordinates they could see how the co-ordinates were interchanged, and were reflected in $y = x$. This was a great moment! We then looked at why $y = (x^2 + x)/2$ should be between $y = x^2$ and $y = x$. Until I used the word "average" they were blank, but they then started explaining to each other why it had to be an average. This was an exciting moment in the lesson. We then looked at using the functions on the page to add together to give $y = 2\sqrt{x} - x$."

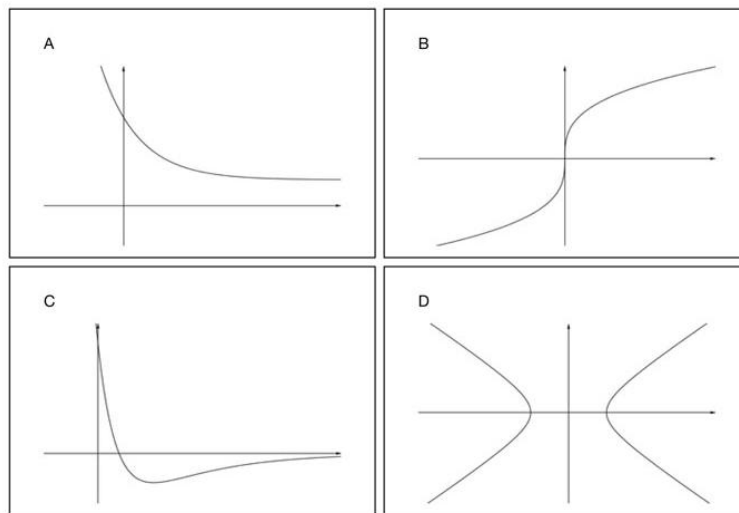
Descriptions and graphs

How would you describe what an asymptote is?

Here are some descriptions or statements about asymptotes.

1. "An asymptote is a line which a curve gets closer and closer to but doesn't meet."
2. "An asymptote is a line which a curve approaches as x tends to infinity."
3. "A curve can't cross an asymptote."
4. "Asymptotes are parallel to the coordinate axes."
5. "A graph can only have one asymptote parallel to each axis."
6. "Asymptotes occur when a function isn't defined for certain input values."
7. "A function tends to positive infinity on one side of an asymptote and tends to negative infinity on the other side."

We have provided some examples of curves on cards. Some of the curves have asymptotes. Use these to help you decide whether you agree with the statements above.



"I introduced the idea of a function and mappings, with some graph sketches to identify which were functions. We then moved on to look at the asymptote descriptions and cards (from Approaching Asymptotes). These were very successful, with lots of comments like: "...but this one has more than one asymptote", "...this one isn't vertical". We quickly agreed the statements that were obviously true or not, and focused in on statements 4 and 7. By the end of the session they had a very good understanding of asymptotes, division by zero, and the relationships to graph shapes. Both activities had forced them to think deeply about functions and led to high quality discussion."

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Spread the word

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If you wish to demonstrate CMEP resources with colleagues or other schools, then please let us know. We can send you postcards and leaflets to hand out. The postcards show some of our resources and the leaflet explains the project's aims and beliefs as well as providing information about the website. You can also download the leaflet [here](#).

If you are working with other schools then we can provide logins for them to access the site. We would be interested to hear from those spreading the word, and would love feedback from you about the site, the resources and how you have used them. For all of the above please contact us..

Meet the CMEP team - upcoming events [\(Back to Top\)](#)

We've been out and about quite a bit recently with lots of visits to school and several conference workshops, notably:

- FMSP KS5 London Network CPD event - 3rd July 2015, Anna Baker and Paul Brown presented CMEP to a group of 80 teachers
- MEI Workshop - 25th to 27th June 2015, Nathan Barker and Lizzie Kimber ran a workshop for teachers
- AAMT conference, Adelaide - 6th July 2015, Lynne McClure shared CMEP aims and resources with this international audience

And over the next few months:

- 23rd July - ICTMA - Nathan Barker and Lynne McClure will be sharing CMEP resources, especially those with a modelling aspect, with an international audience.
 - 27th - 30th July 2015 - CMEP Summer Workshop - We'll all be involved in the annual summer workshop for participants from our network of schools.
 - 5th September 2015 - Mathematical Association - Nathan Barker will be sharing CMEP resources at this one-day Conference for Teachers of Secondary Mathematics
 - 22nd - 25th September 2015 - ISDDE - Lynne McClure will be taking part in the task design workshops at this year's conference in Colorado.
 - In the next academic year our popular nation-wide CPD days run by MEI will be starting again.
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Join the CMEP Community [\(Back to Top\)](#)

The Cambridge Mathematics Education Project (CMEP) is a new initiative, based in the University of Cambridge's Faculty of Mathematics and funded by a grant from the DfE, which aims to

enhance post-16 mathematics education.

CMEP is developing innovative resources to help support and inspire teachers and students of A-level mathematics and similar qualifications. Throughout the project, we are carefully considering both the learning needs of the students and the associated issues facing teacher. We are working closely with teachers from a range of different schools throughout the development process to gain formative feedback and input.

Schools, college and academies across the UK are warmly invited to register as CMEP Affiliate Schools. Registration as an Affiliate School gives free access to the CMEP online resource. For more information, please click on the link below.

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