MAS156: Mathematics (Electrical and Aerospace)

Prof Koji Ohkitani
mas-engineering@sheffield.ac.uk

Tuesday 26th September 2017, 1pm
Diamond LT4

About the course

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- work on exercises from exercise sheets in your own time.

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Course website

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There is a discussion board for the course, found via the course website. Please use the discussion board to ask (and answer!) questions about the course. Koji, James and Sam will read this occasionally and deal with unanswered questions when appropriate.

Timetable

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Past papers for the exam will be made available nearer the time.

Video lectures and online tests

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You won't receive any reminders: it's your responsibility to log in twice a week and watch the videos and do the tests!

We recommend you log in and attempt the tests as soon as possible (preferably today!).

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Problem classes

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Exercises

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Full-class lectures

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Text books

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Calculators

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If your calculator is not an approved model, you can still use it for problem classes but you must get an approved one before the summer exam.

Reading week

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Engagement

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- use the discussion board for extra help.

Syllabus, Weeks 1–4

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Functions, such as $f(x) = x^2$ or $g(x) = e^x$, take an input number, x, and assign an output, $f(x)$, according to a given rule. Functions are fundamental to mathematics, so we'll start with the basic definitions and terms (such as domain and range) used when discussing them.

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The *trigonometric functions* are widely used, so we'll recap the basics of these, including the algebraic identities that hold. We will also look at polynomials, and how the binomial theorem can simplify working with them.

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In Week 4 we will move on to *differentiation*.

Activity

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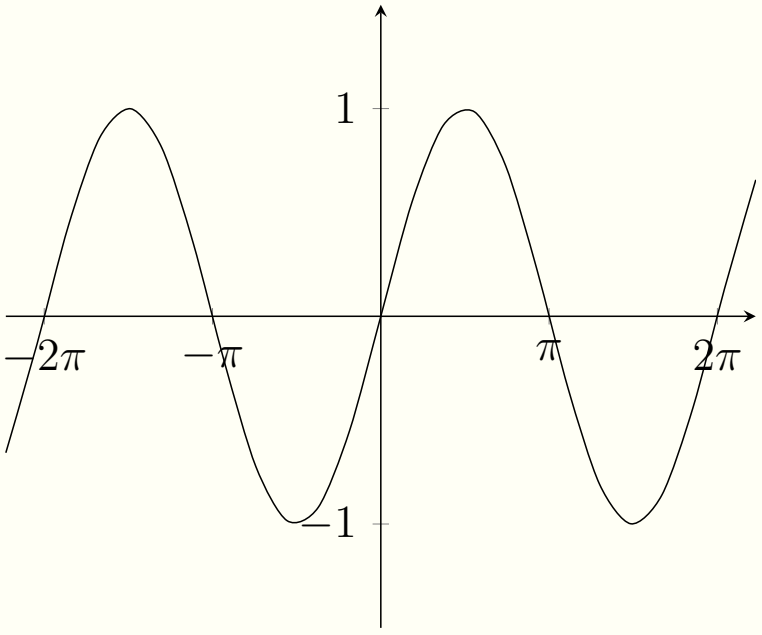
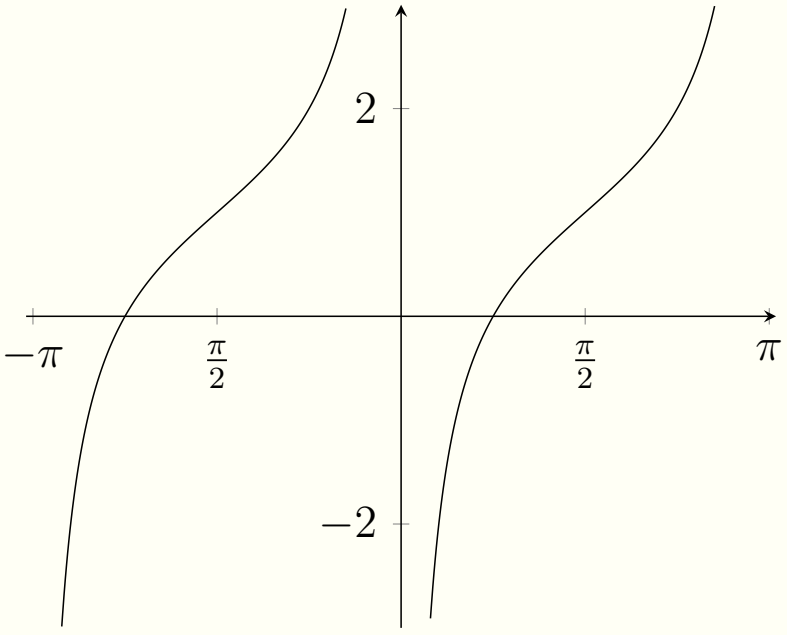
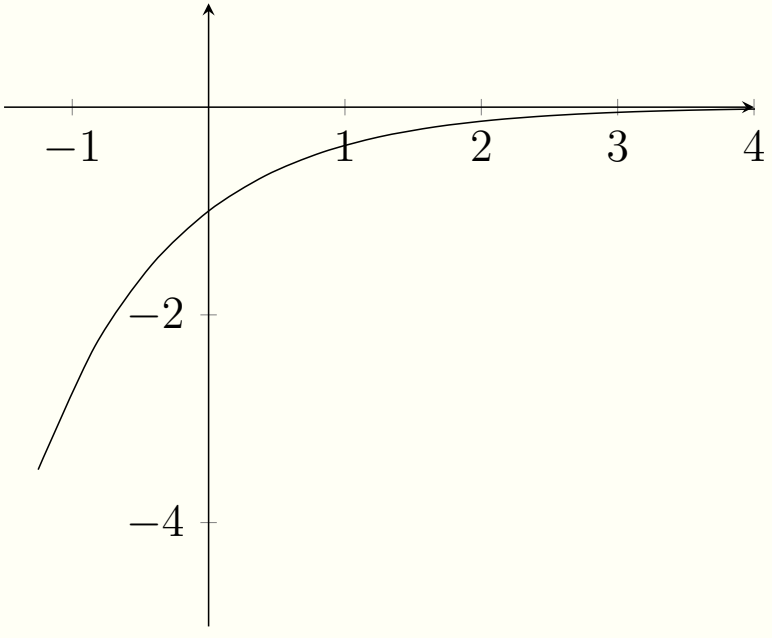
Once you have identified the functions, discuss any understanding you have of the terms *domain*, *range*, *odd*, *even*, *periodic*, and *continuous* which appeared in the earlier slides.

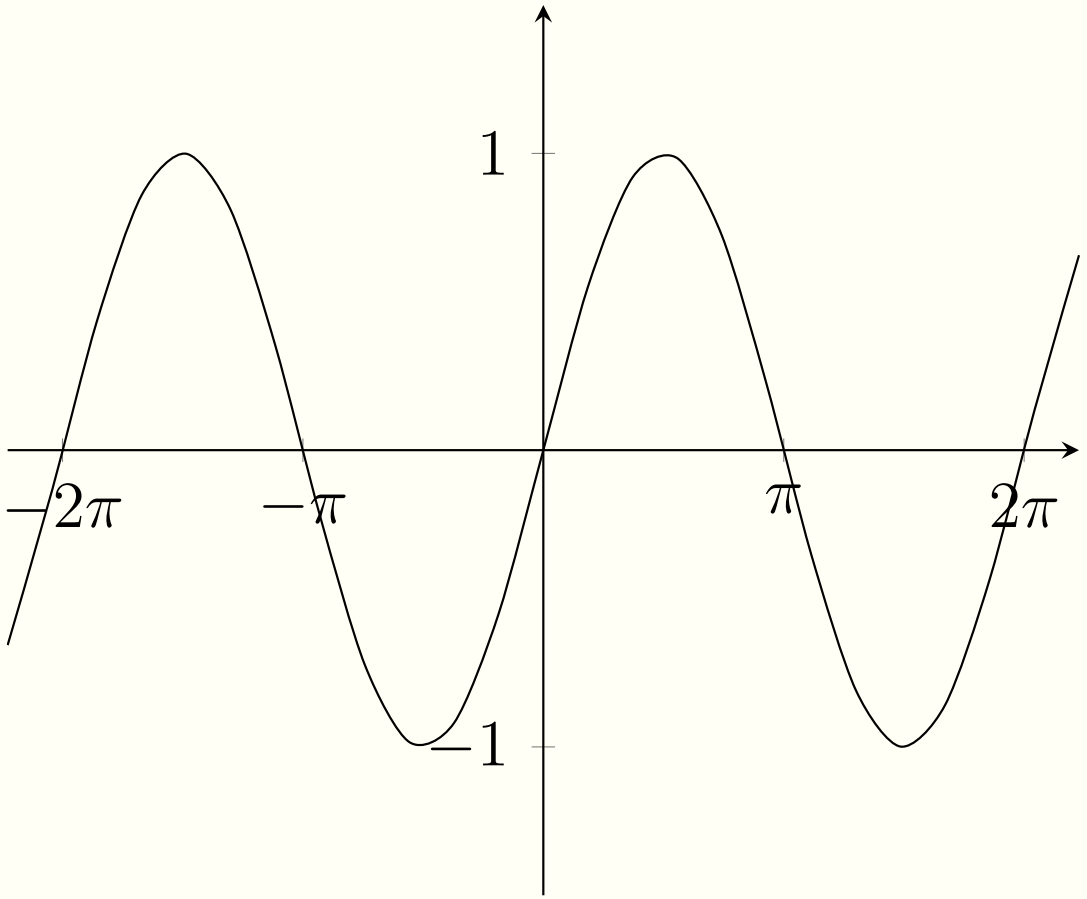




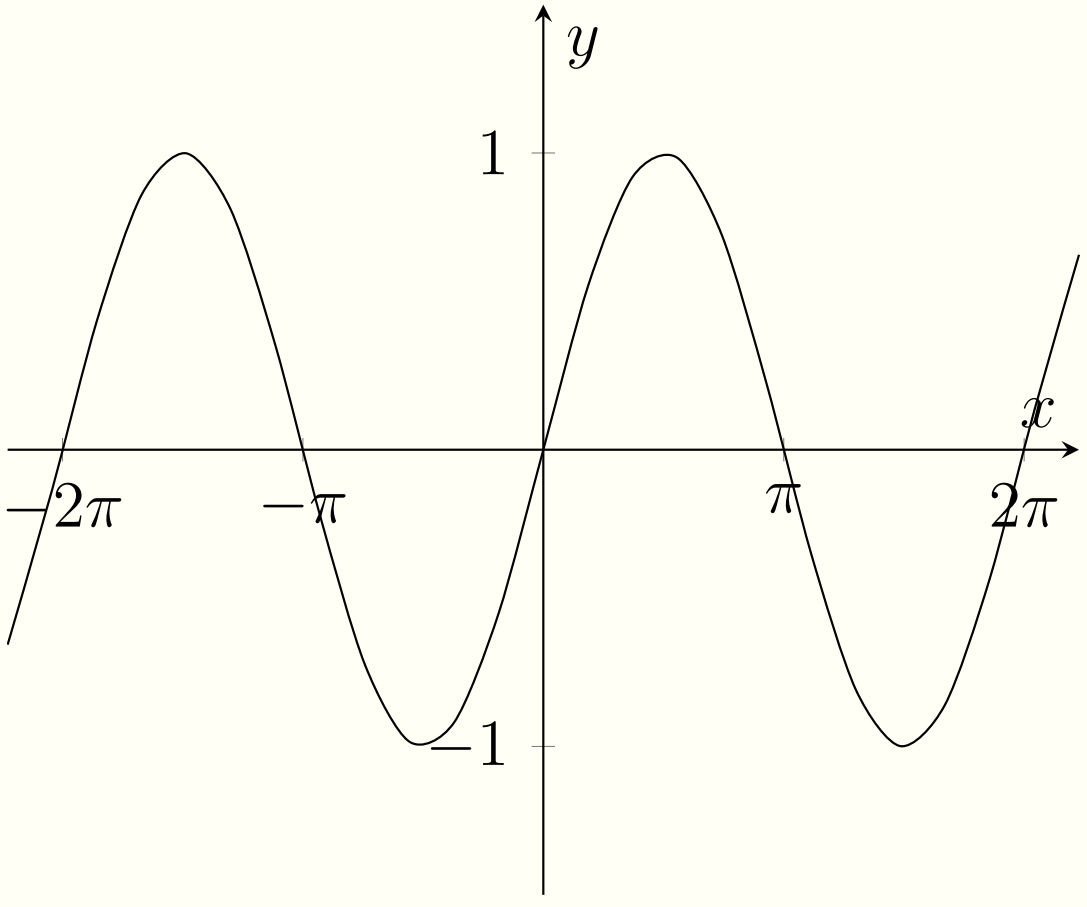


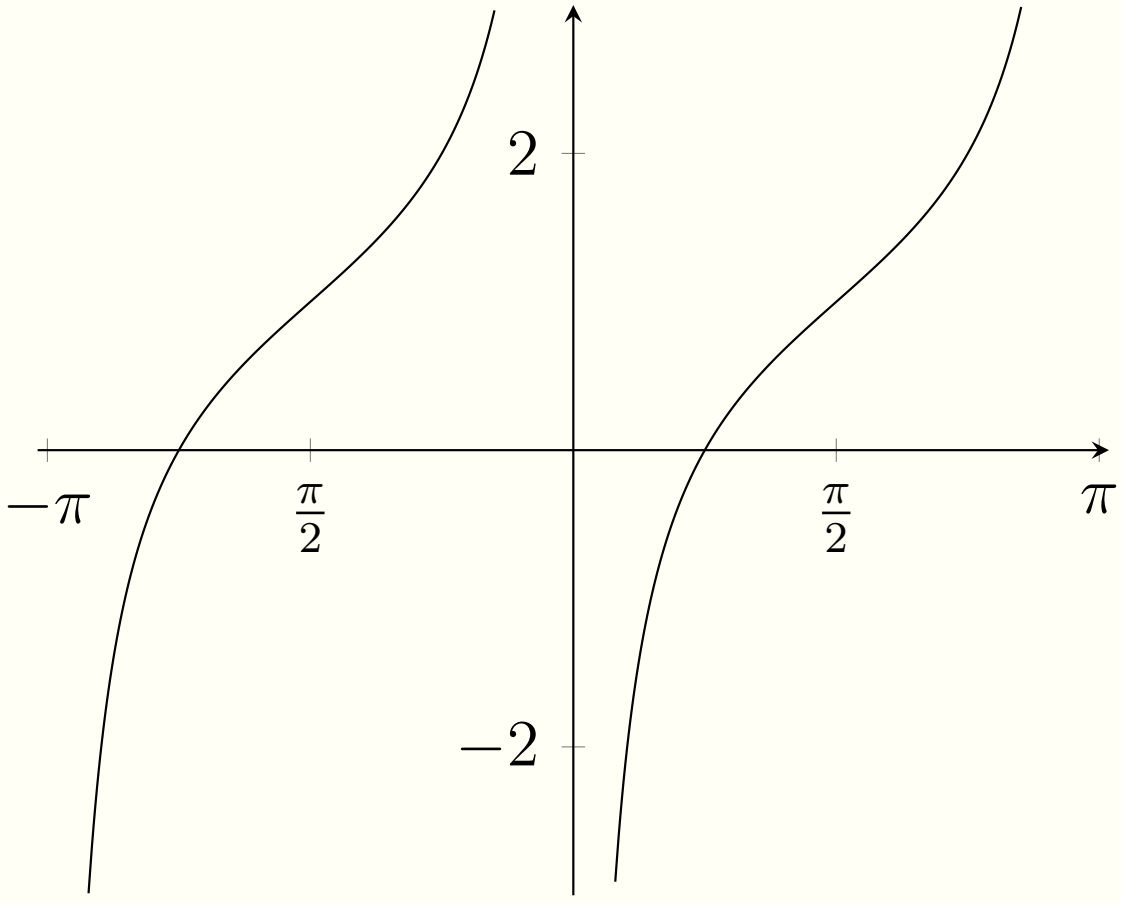
Terms: *domain*, *range*, *odd*, *even*, *periodic*, *continuous*.

Answers

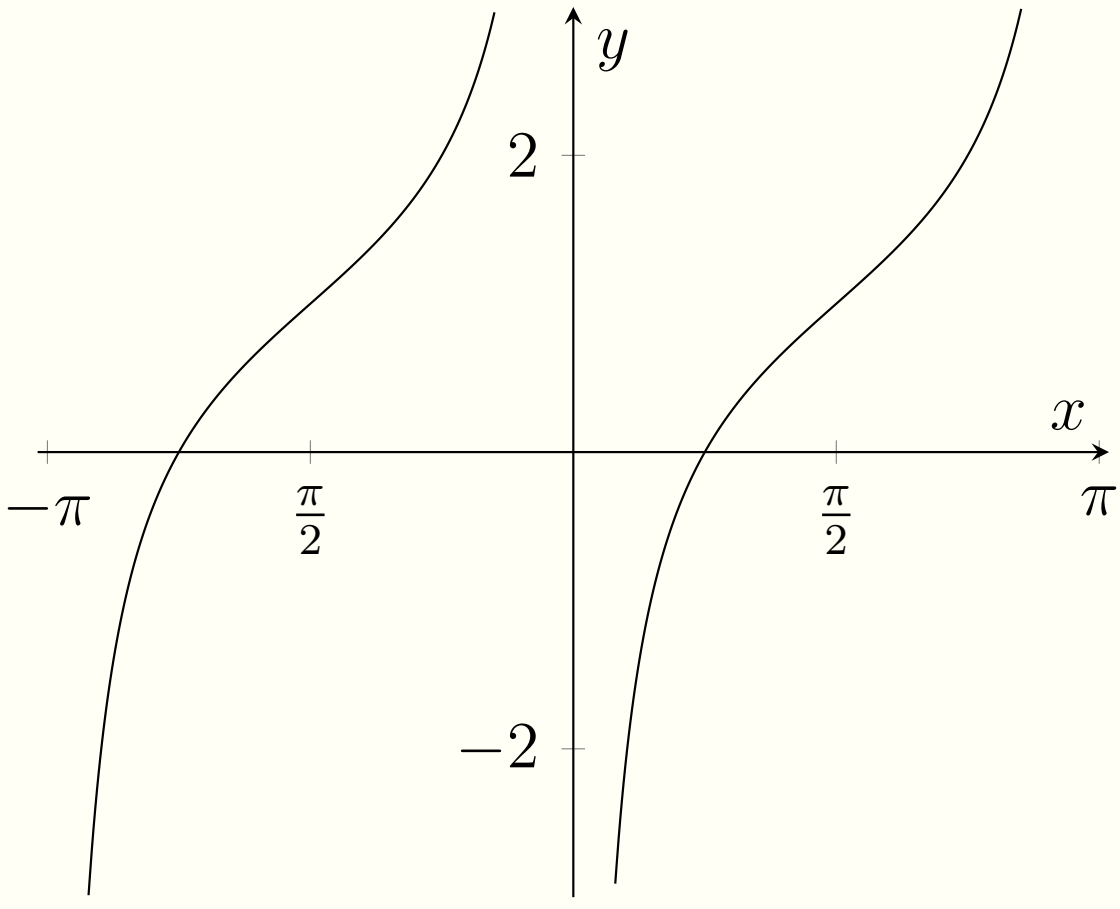

1
−2π
−π
π
2π
−1

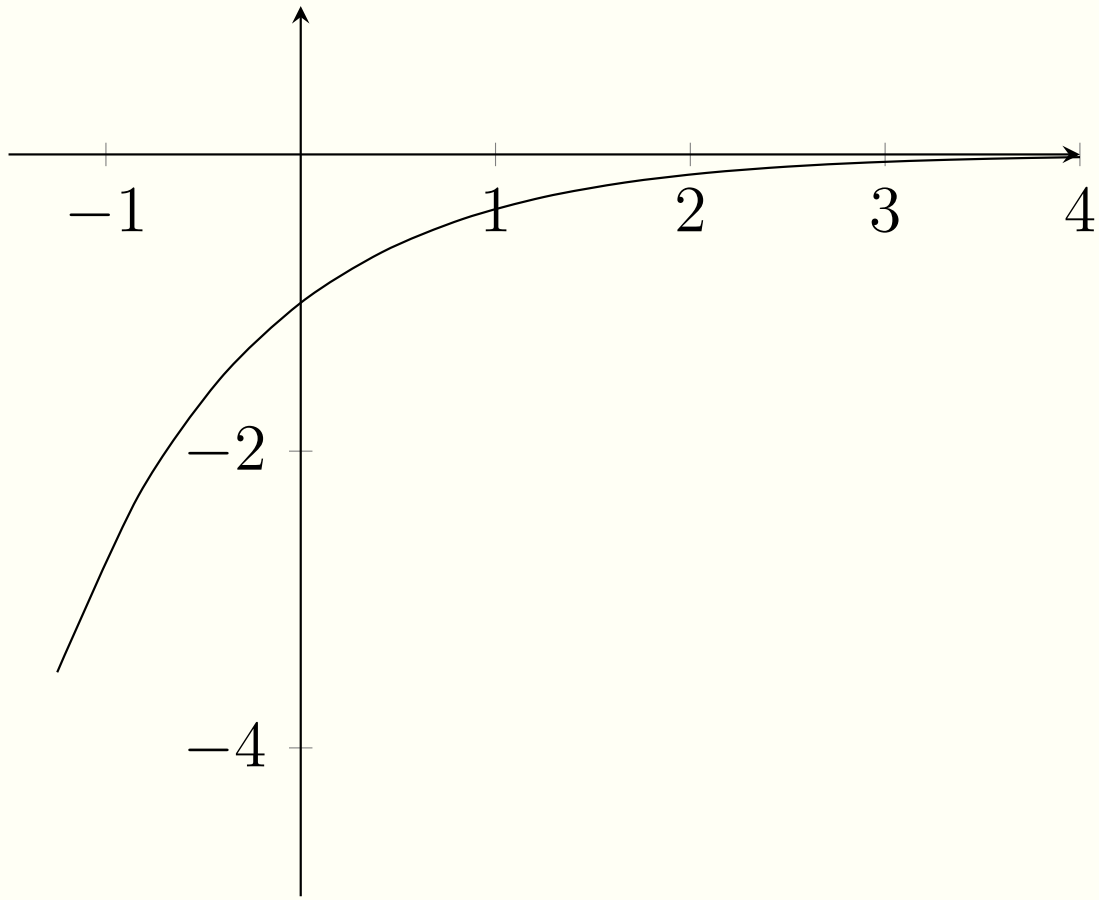
$$y = \sin x$$



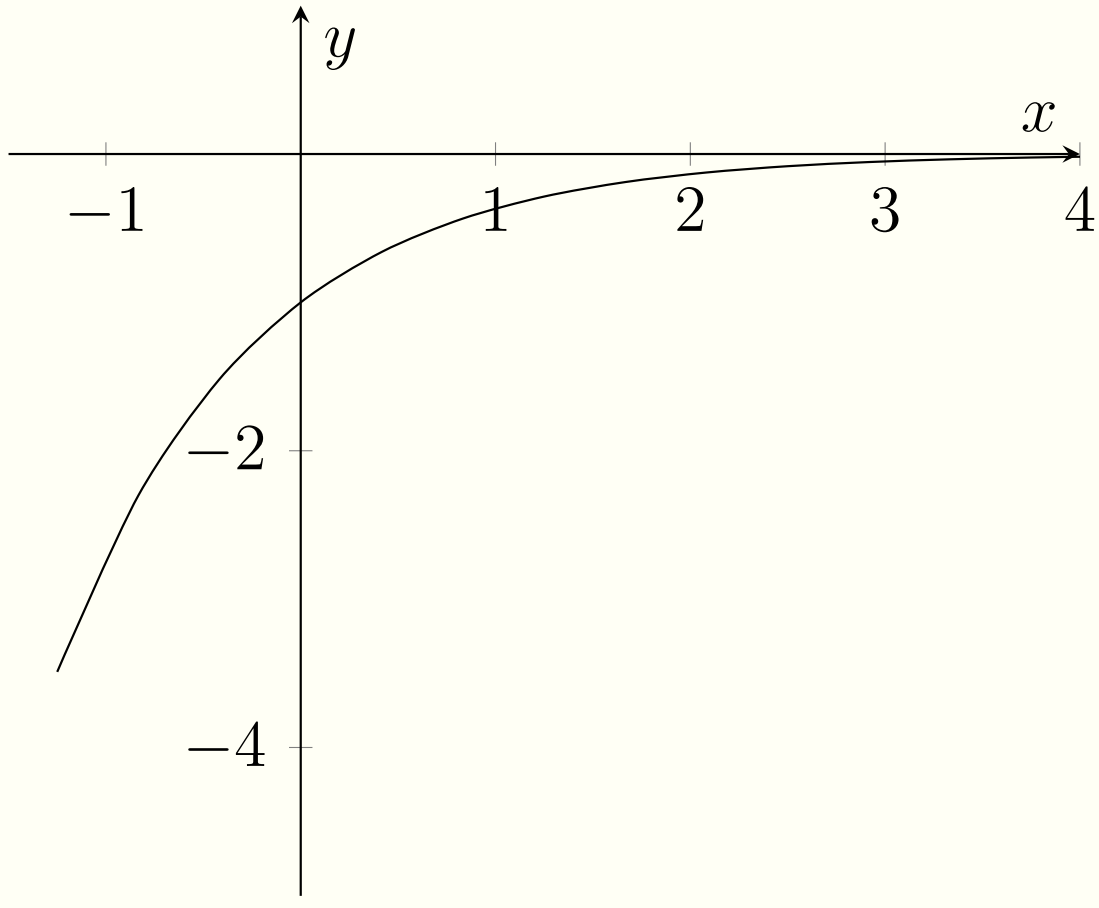

2
−2
−π
π/2
π/2
π

$$y = \tan(x - \tfrac{\pi}{2}) + 1$$




−1
1
2
3
4
−2
−4

$$y = -e^{-x}$$



Reminders

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I hope you enjoy the first few weeks of the course.