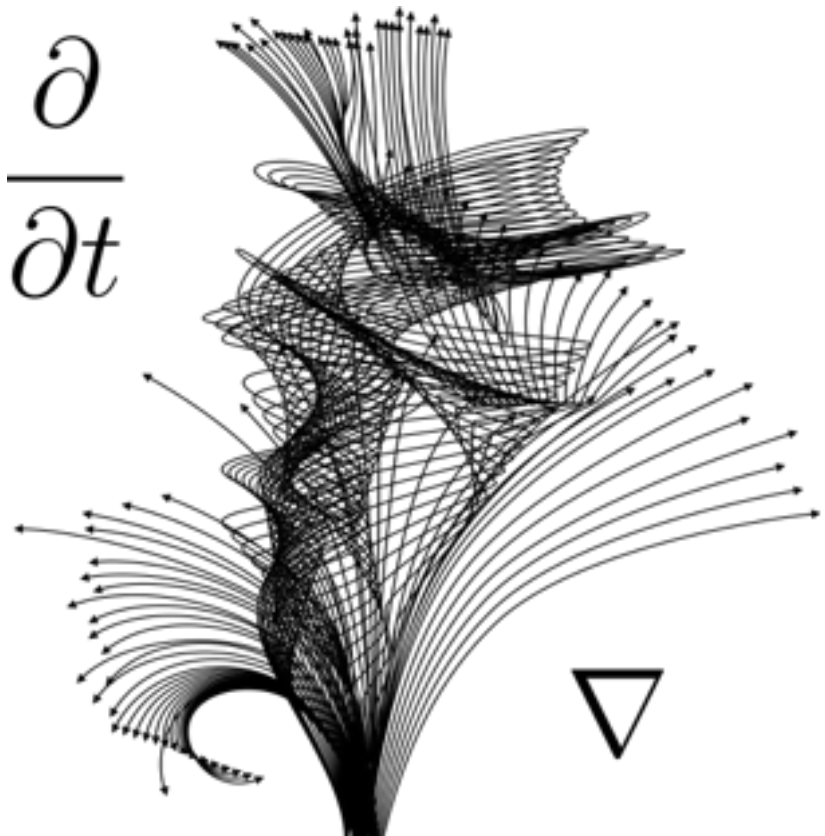
Differential Calculus with Applications to Life Sciences

Math 102:105

Pooya Ronagh

Agenda for today:

- Inverse trig functions
- Zebra Danio



Inverse trig functions

Which of the following is false?

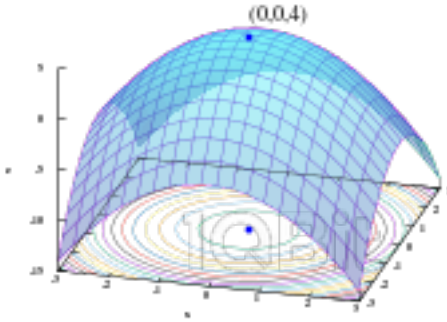
(A) $\cos(\arctan(\sqrt{3})) = 1/2$

(B) $\sin(\arccos(1/2)) = \sqrt{3}/2$

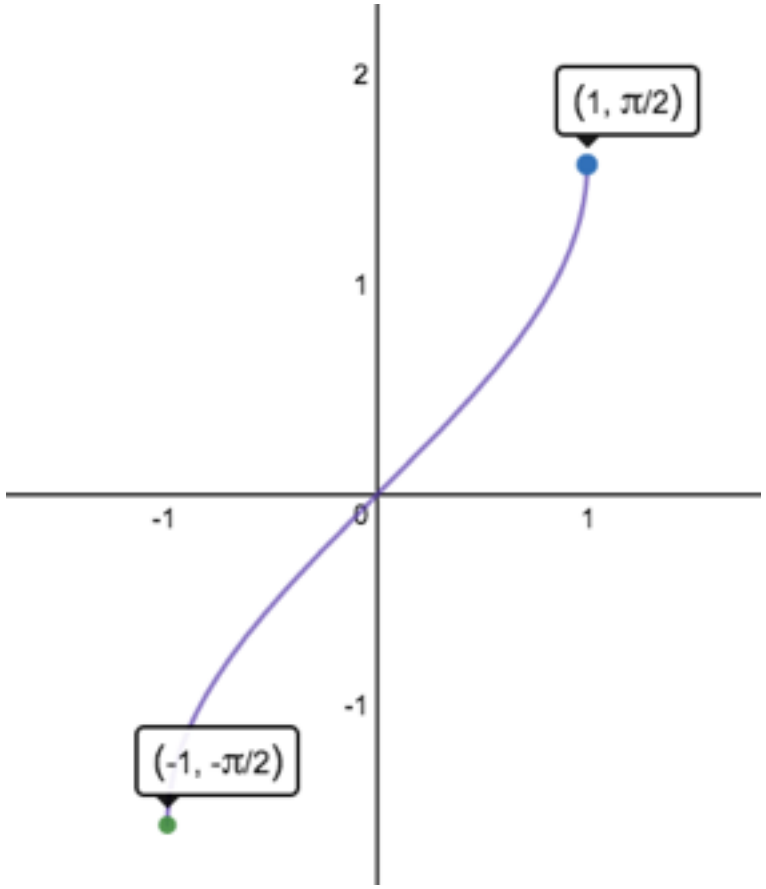
(C) $\arctan(1) = \pi/4$

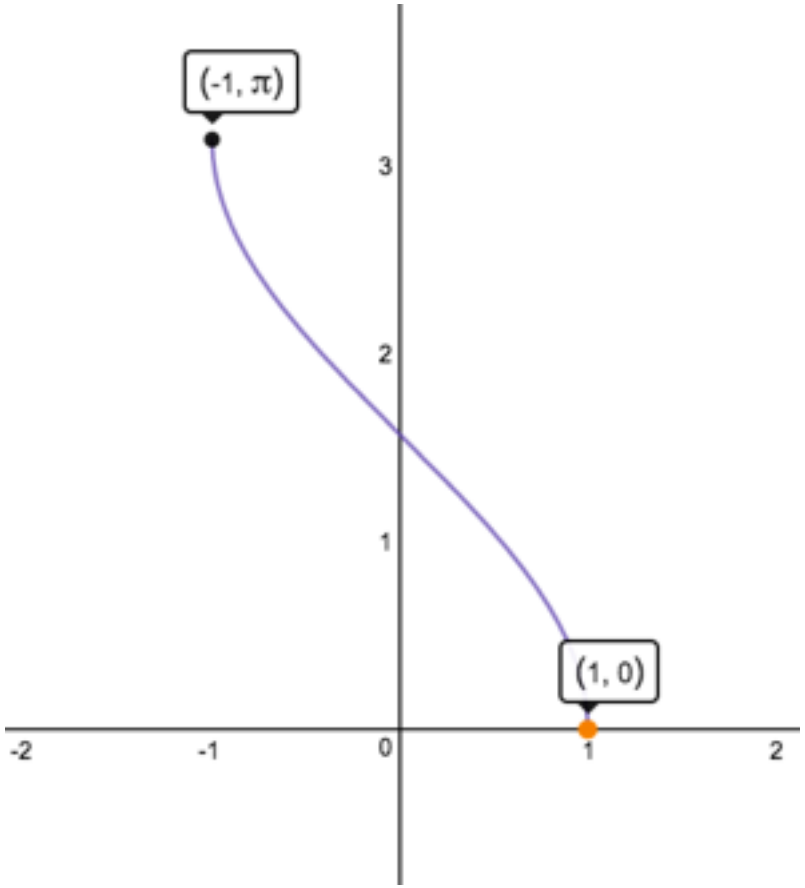
(D) $\arcsin(1/2) = \pi/3$

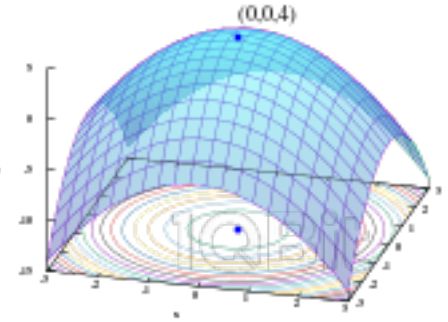
(E) $\sin(3\pi/2) = -1$



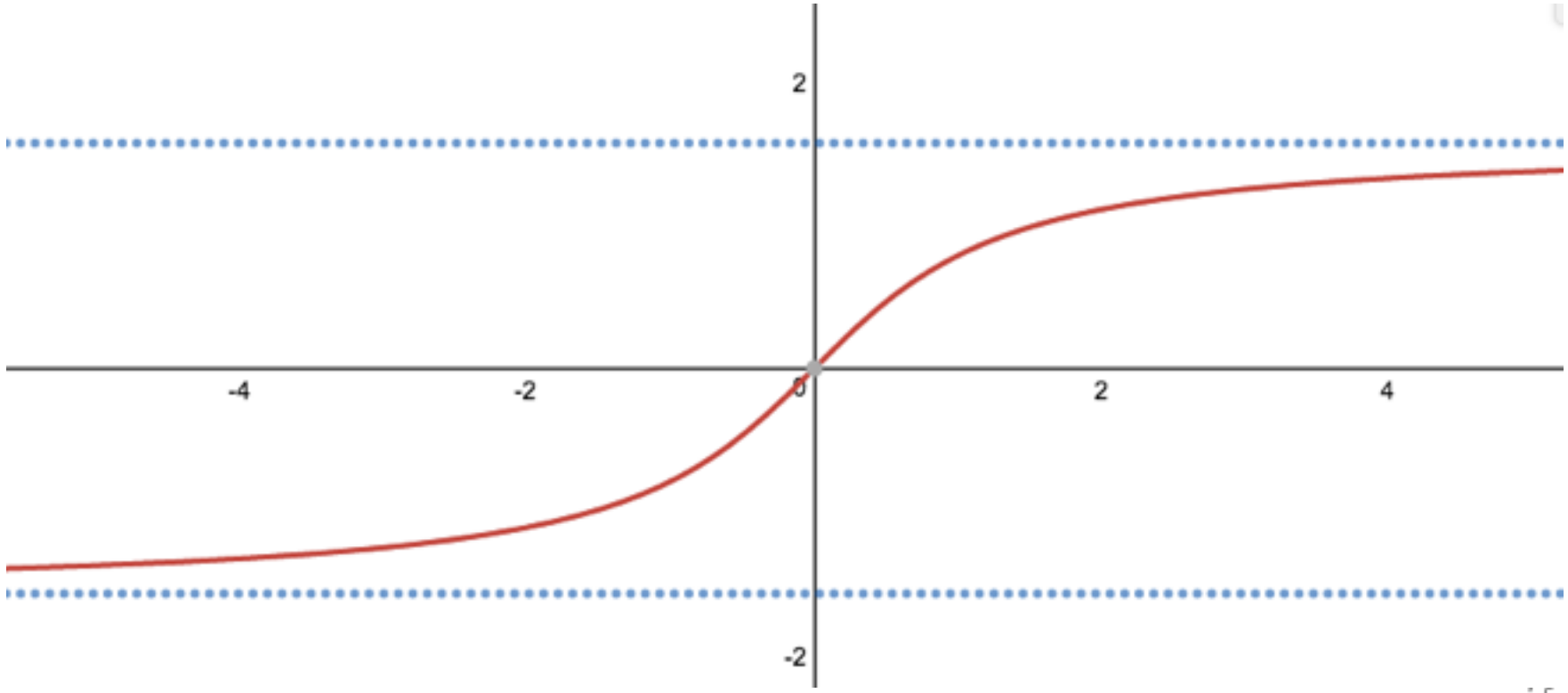
Domain and range of inverse trig functions

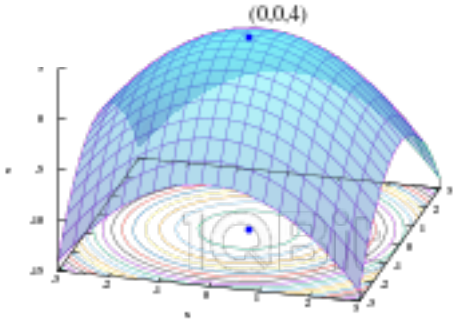




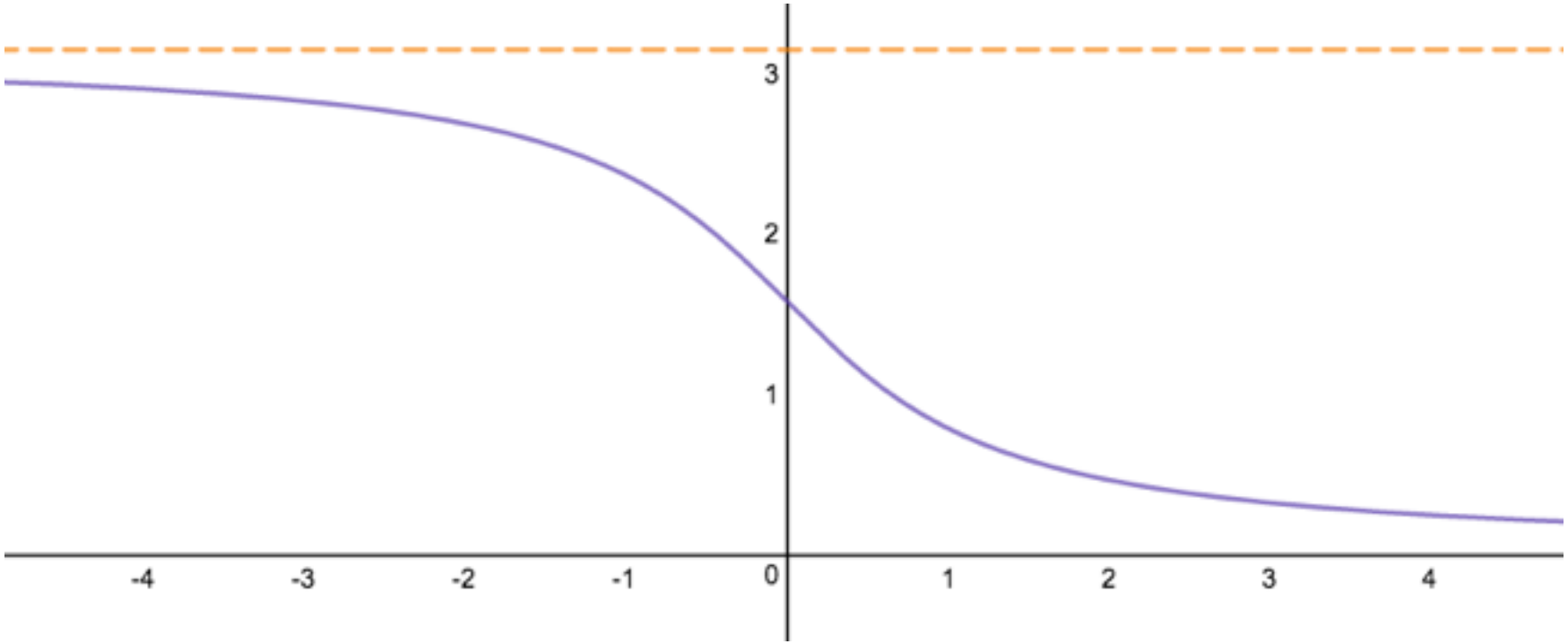


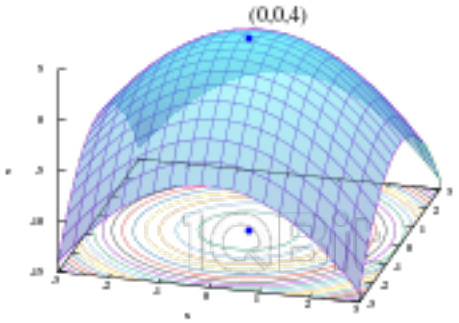
Domain and range of inverse trig functions





Domain and range of inverse trig functions

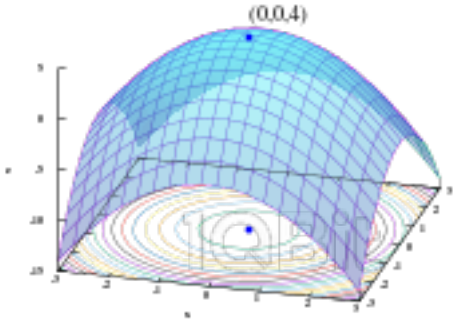




Derivatives of inverse trig functions

We use the same method we used to find the derivative of y= ln(x).

Remember?



Derivatives of inverse trig functions

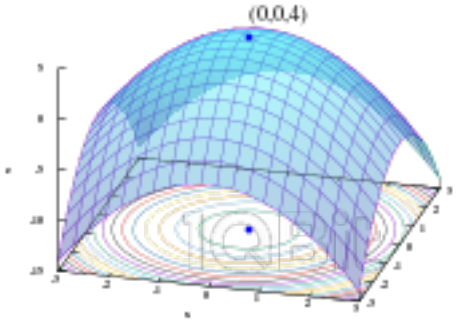
We use the same method we used to find the derivative of y= ln(x).

Remember? Use implicit differentiation!

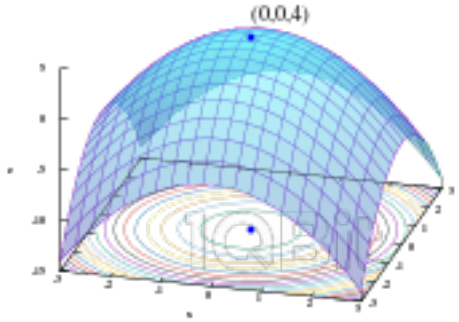
If $y = \arcsin(x)$

then $\sin(y) = x$

Now take derivative and solve for y'…



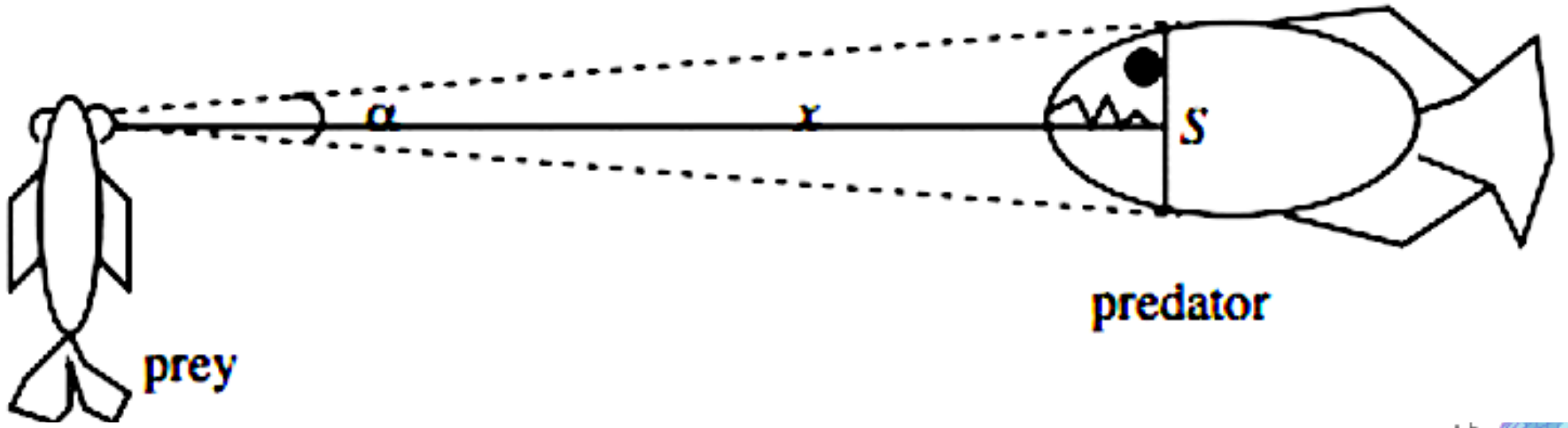
Zebra Danios escape response

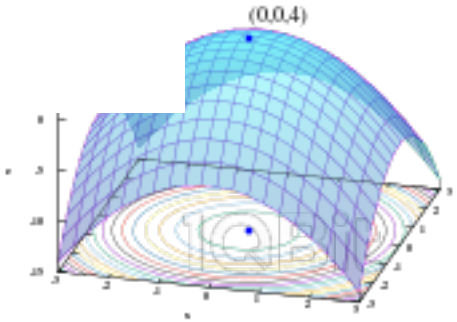


Zebra Danios escape response

Hypothesis:

Escape response is triggered when $\frac{d\theta}{dt} > k$



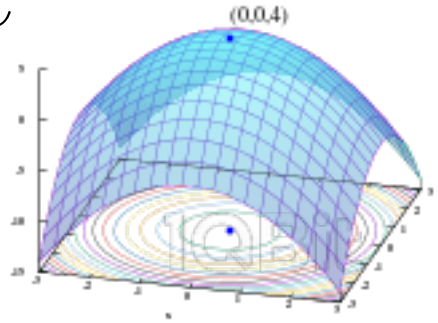


Zebra Danios escape response

Assuming the Zebra Danio reacts to a rapidly changing optical angle θ, it will try to escape from…

(A) ...a very large predator (large S).
(B) ...a very small predator (small S).
(C) ...a predator that is far away (large x).
(D) ...a slow-moving predator (small v).
(E) ...a fast-moving predator (large v).

$$\frac{d\theta}{dt} = \frac{Sv}{\frac{S^2}{4} + x^2}$$



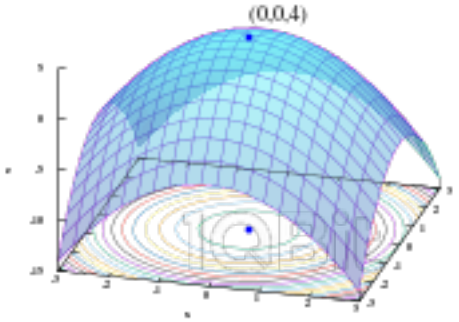
Announcements

The final exam will be held on Dec 12 at 8:30 am, 2016

Final exam information page:
https://wiki.math.ubc.ca/mathbook/M102/Final_exam_information

Office Hours:

Monday Dec 5, MATX 1102, 10am-12:30pm
Study sessions on Friday Dec 9, ESB 1012, 1pm-5pm



Course Evaluation until Dec 5

Introduction

The University of British Columbia values the quality of the teaching we offer to UBC students. We encourage faculty to understand what is effective teaching, to use those approaches which work, to develop new approaches to teaching, to use innovative teaching and learning methodologies, and to implement leading-edge technologies in the classroom where appropriate.

Student evaluations of teaching help us to identify and to support effective teaching and provide the University community with information about student perceptions of the quality of instruction at UBC.

And… that’s a wrap! =)

Dec 8 WW 13