

## Calculus Songs compiled by Sean Bird

<http://courses.ncssm.edu/math/TCMConf/TCM2001/TCM2001.htm>

contains the Product Rule and Chain Rule song by Floyd Bullard

### 18. Chain Rule

You want to take the derivative of the sine of  $x$  squared.

There's a function inside of another one there

Identify the inner, identify the outer,

And then you apply the chain rule:

Derivative of the outer with respect to the inner

Times the derivative of the inner. . . the Chain Rule.

Derivative of the outer with respect to the inner

Times the derivative of the inner. . . the Chain Rule.

The derivative of the natural log of  $x$  squared plus 1.

A composition of two functions, so what's to be done:

Identify the inner, identify the outer,

And then you apply the chain rule:

Derivative of the outer with respect to the inner

Times the derivative of the inner. . . the Chain Rule.

Derivative of the outer with respect to the inner

Times the derivative of the inner. . . the Chain Rule.

### 19 Product Rule

$x$  times  $e$  to the  $x$

How fast does it change per unit change in  $x$ ?

How would I take the derivative, yes I'd look like a fool

if it wasn't for my baby the Product Rule. mmm

The first time my true love beckoned, I thought my heart would burst

The first times the derivative of the second

plus the second times the derivative of the first.

Oh, that's my baby, the Product Rule.

$t$  times the cosine of  $t$

How fast does it change, a derivative that would be?

But how would I take the derivative, yes I'd look like a fool

if it wasn't for my baby the Product Rule. mmm

The first time my true love beckoned, I thought my heart would burst

The first times the derivative of the second

plus the second times the derivative of the first.

Oh, that's my baby, the Product Rule.

### 20. THE DERIVATIVE SONG [tune: Happy Birthday to You]

(Words by Denise Fuji McCleary)

One prime two plus two prime one

One prime two plus two prime one

I just did the product rule,

That means I am Cool!

The quotient rule I need to know

Low  $d$  high less high  $d$  low

Draw a line then there below

Put the square of the low.

### 21. CHAIN RULE SONG [tune: America the Beautiful]

(Words by Denise Fuji McCleary)

The Chain Rule is not hard to do

We need to sub a "u"

The "u" is just the inside of

Composite "f of u"

We'll multiply f prime of u

Times  $du/dx$ , Hence,

$dx$  of f of g of  $x$  is

Found with diligence!

### 22. Mathematical christmas carol: Calculus

[Sally Picciotto sent this to me. It was written by Deborah Alterman, Martin Mohlenkamp, and Gareth Roberts (all rights reserved). ]

(Sung to the tune of Jingle Bells)

Looking for the tangent

It's really  $m$  we seek

With epsilon and delta

Mathematics looks like Greek

Trying to find a limit

Everything gets small

If you can't determine it

You land in L'Hopital

Calculus, Calculus Let us celebrate

Riemann Sums, so much fun We can integrate

Hey! Calculus, Calculus Let us celebrate

$dx, dy, dz, dt$  We love related rates

Calc 2 is coming next

The really fun stuff starts

Integral  $x \sin(x)$

Only works in parts

Summing the series harmonic

The terms keep getting small

But isn't it ironic?

It won't converge at all

Calculus, Calculus

Put your mind at rest

Most divergent series fail

The Root or Ratio Test

Hey! Calculus, Calculus

While we sing this song

We can sum  $(1/2)^n$

It won't take all day long

Now on to Calc 3

Learning spheres and cones

Maximizing functions

With seventeen unknowns

Fancy vector fields

Finding flux of curl

Using Mr. Stokes

Over a circle

Calculus, Calculus

Ain't it really cool

Gauss and Green are really keen

Don't take them for fools

Hey! Calculus, Calculus

Ain't it really cool

$f$  and  $g$ , composing thee

Time for the chain rule

### 23. Calculus

[from Dr. T's Lonely Staff Club Band written by Meep, Dave, with some help from the rest of the Mathcamp 1999 staff]  
(*Tune of Yesterday*)

Calculus

I don't see whats all the fuss

I've got some issues that I must discuss

Oh I dont get this calculus

Epsilon - where have all those pesky deltas gone  
I think this series just goes on and on  
but I must bound by epsilon.

dy dt adds discontinuity  
It's such an awful fate  
I learned, one day  
the Riemann way  
and now I can't integrate

Calculus - switching limits you must distrust  
unless you've got bounds and then it's just-  
ified in our calculus

dy dt adds discontinuity  
It's such an awful fate  
I learned, one day  
the Riemann way and now I can't integrate

Calculus - switching limits you must distrust  
unless you've got bounds and then it's just-  
ified in our calculus  
mmm mmm mmm mmm mmm mmm

### 24. There's a delta for every epsilon

[ A Tom Lehrer ditty. You can find it in the American Mathematical Monthly, 81 (1974) 612. ]  
(*Calypso*)

There's a delta for every epsilon,  
It's a fact that you can always count upon.  
There's a delta for every epsilon  
And now and again,  
There's also an  $N$ .

But one condition I must give:  
The epsilon must be positive  
A lonely life all the others live,  
In no theorem  
A delta for them.

How sad, how cruel, how tragic,  
How pitiful, and other adjectives  
That I might mention.  
The matter merits our attention.  
If an epsilon is a hero,  
Just because it is greater than zero,  
It must be mighty discouragin'  
To lie to the left of the origin.

This rank discrimination is not for us,  
We must fight for an enlightened calculus,  
Where epsilons all, both minus and plus,  
Have deltas  
To call their own.

### 25. Fifty Ways to Do an Integral

[by David Morgereth in *The Mathematics Teacher* 10/01]  
*Tune: "Fifty Ways to Leave Your Lover," by Paul Simon*

"The problem is all inside your head," he said to me.

The answer is easy if you don't forget plus C.

I'd like to help you in your struggle to succeed.

There must be fifty ways to do an integral.

He said it's really not hard for you to do.

Furthermore, I hope my meaning won't be lost or  
misconstrued,

So I'll repeat myself At the risk of confusing you.

There must be fifty ways to do an integral.

Refrain:

Use the FTC, Lee.

Plug in a tan, Stan.

Do it by parts, Art,

But get the thing done.

Just plug in a u, Sue.

Use a table, Mable.

How about a machine, Gene,

To set yourself free?

He said you should know this better than your name.

If only there were something to make you understand.

I said, "I appreciate that!"

And would you please explain about the fifty ways?"

Refrain

He said, "Why don't you just work on it all night?"

I believe by the morning you'll have the answer right."

And then it hit me... this course is such a fright.

There must be fifty ways to do an integral.

### 26. Calculus Song

[New lyrics by Rosie Medeiros]

*Tune: "Zero" by the Smashing Pumpkins*

What if all I have is the derivative?

What if I want the equation of the graph?

Wanna find  $f(x)$

Calculus is fun it is my favourite class oh yeah

Calculus is fun

Derivatives and integrals and polar graphs and  
coordinates, the

Product rule, the power rule and don't forget the chain  
rule.

Every Wednesday after school I like to go and  
eat Mrs. Pleacher's cookies.

I like to go and get some help cause all this calculus  
is making me confused.

Low di high minus high di low over low squared

That's the quotient rule.

Wanna find  $f(x)$

Calculus is fun it is my favourite class oh yeah

Calculus is fun

I love this class more than life itself.

It makes me feel so smart.

Wanna find  $f(x)$

Calculus is fun it is my favourite class oh yeah

Calculus is fun, Mr. Pleacher's the best.

## 27. I Am the Very Model of a Modern Mathematician

[by Lin Parker in *The Mathematics Teacher* 10/01]

Tune: "I Am the Very Model of a Modern Major General," from the *Pirates of Penzance* by Gilbert and Sullivan

I am the very model of a modern mathematician;  
I'm fluent in all measurings, both metric and American;  
I know that pi is 3.141592654  
And many many many many many many places more.

I can figure averages-mean and mode and median;  
And I can crunch the numbers for a standard deviation;  
I check the tails of normal curves, 5 percent in each; and hence  
Reject the null hypothesis with ninety percent confidence.

Reject the null hypothesis with ninety percent confidence,  
Reject the null hypothesis with ninety percent confidence,  
Reject the null hypothesis with ninety percent confidence.

I'm very good at integral and differential calculus;  
At finding max and minimums, I'm simply just miraculous;  
In matters mathematical- both simple and quadratical,  
I am the very model of a modern mathematician.

In matters mathematical- both simple and quadratical,  
He is the very model of a modern mathematician.

## 28. AP Calc Theme Song [tune: Down by the Riverside]

click here if you don't know the melody - it will take a few seconds to load.  
<http://www.artistdirect.com/music/stream/player/rm/0..2893801-5925808.00.html>  
(Words by Denise Fuji McCleary)

I'm going to pick up my pencil  
And learn to show my work  
Find lots of limits and  
Prove continuity  
I'm going to pick up my pencil  
Where are those asymptotes?  
Find those asymptotes!

*Refrain:*

I'm going to study calculus  
Study calculus  
Study calculus  
I'm going to study calculus  
Study calculus  
Study calculus

I'm going to pick up my pencil  
And find  $dy/dx$   
Let's differentiate  
And learn to integrate  
I'm going to pick up my pencil  
And learn to sub a "u"  
Learn to sub a "u"  
(Go to Refrain)

I'm going to pick up my pencil  
And learn to justify  
Can't use a number line  
We'll need some words sublime  
I'm going to pick up my pencil  
And got to find "f prime"  
Got to find "f prime"  
(Go to Refrain)

I'm going to pick up my pencil  
And learn to analyze  
Where f is concave up  
That means it's like a cup  
I'm going to pick up my pencil  
Where f is concave down  
That means it's like a frown  
(Go to Refrain)

I'm going to pick up my pencil  
And solve that diff e-q  
At first we separate  
Then we must integrate  
I'm going to pick up my pencil  
Then find our c and y  
Find our c and y  
(Go to Refrain)

29. "Those Things I can't Define" Tune: "[Closer to Fine](#)" by the Indigo Girls (Note to musical comedy lovers everywhere...If you just read this, straight, it isn't funny. The only way it works at all is if you know the original tune, and sing it to yourself as you read it. Or better yet, sing it aloud! by Kenny Felder, modified by Chris Beard – Covenant '06)

I'm trying to get through this alive,  
Maybe figure out these tangents and cosines,  
And the best thing you've ever done for me  
Is to help me take this course less seriously,  
It's only math, after all  
yeah

Well, I kind of understood my high school algebra,  
And in trig at least I pulled a solid "B",  
But Calculus-I don't know why I'm in it,  
Excuse me, but I think I've reached my limit,  
As I approach despair.

*Chorus:*

*These "D"s and these "X"s, they make me so nervous,  
Who cares what the area under a curve is?  
I don't know the answer to these questions,  
slopes and curves and tangent lines,  
And the less I see the point of the derivative,  
Those things I can't define.  
Those things I can't define*

Well, I went to see the teacher, with a sheepish grin,  
And he looked at me like I was just a wart upon his chin,  
I've tried so hard, but I can't understand it,  
I'm so right brained that I can write left handed,  
I spent four hours prostrate, staring at the wall,  
And I still don't understand "e".  
(Chorus)

I stopped by the Web at three a.m.  
To seek help from [alt.algebra](#), and possibly from [Ken](#),  
But this is just a way that my brain won't work,  
So listen, if you'll only do my homework,  
I'll help your favorite charity. (Chorus)

### 30. Log Base Change Property

[Emily Hudspeth '07 Covenant]

*Tune: Silent Night*

Log base b of x

is log base a of x

all over log base a of b

this is the general equation

for the change of base property

for all the different logs

now go pass your test

### 31. Fundamental Theorem of Calc

[Emily Hudspeth '07 Covenant]

*Tune: Jingle Bells*

F of x

F of x

if in-te-gr'ble

you can use the fundamental theorem of calculus Hey!

the integral from a to b of f of x dx

is g of b minus g of a

then the answer's g of x Hey!

### 32. E to the x properties

[Emily Hudspeth '07 Covenant]

*Tune: Pop Goes the Weasel*

If f of x is e to the x

then f prime x is the same

and the integral is just alike

except plus C

### 33. I Will Survive - AP Calc Version

[Amy Pennington c/o 2002, Kentridge]

*Tune: "I Will Survive"*

At first I was afraid, I was petrified

Kept thinkin' I could never take this test and stay alive

But then I spent so many nights

Studying so hard

I stayed up late

I learned how to integrate

And so I'm here, to take this test

I'll just walk in and sit right down

I swear I'll do my best

I should have studied all my trig

I should have known related rates

If I'd've known for just one second they'd be on the free response

Go on now, go

Bring on the test

Jump up and down now

'Cause I know this is my quest

Weren't you the one who tried to break me on the sly

Did you think I'd crumble

Did you think I'd lay down and die?

Oh no, not I! I will survive

Oh as long as I know how to think I know I'll stay alive

I've got all my time to muse,

I've got all my brain to use and I'll survive

I'll get a five, hey, hey

It took all the strength I had to get my homework done

Kept trying hard to learn the solids of revolution,

And I spent oh so many nights

Just feeling sorry for myself. I used to cry

But now I hold my head up high

And you see me Somebody free

I'm not that failing little person that I used to be

And so I'm all done with Cov'nant

Off to college is where I am,

Now I'm usin' all my knowledge

for the AP calc exam

Go on now go

(back to chorus)