

Prerequisite Overview

1. Basic Algebra

- Exponents, Radicals, logarithms
- Factoring polynomials, ^{related} functions
- Solving polynomial equations

2. Algebra (Pre-Calculus)

$$2^b \cdot 2^c = 2^{b+c}$$
$$\log_2 b = \frac{\log b}{\log 2}$$

$$\log(a) + \log(b) = \log ab$$

$$x^2 + 5x + 6 = (x+2)(x+3)$$

$$x^3 + x^2 + x + 1 = \underline{(x^2 + 1)} \underline{(x + 1)}$$

$$\left(\frac{p(x)}{q(x)} = \frac{x^2 + 5x + 6}{x^3 + x^2 + x + 1} = \frac{(x+2)(x+3)}{\underline{(x^2 + 1)} \underline{(x + 1)}} \right)$$

same

$$p(x) = 0 \Rightarrow 0 = (x+2)(x+3)$$

$$x = -2, -3$$

$$2x^2 + bx + c = 0$$

$$2x + b = 0$$

$$\int \int f(x, y) \frac{dx}{dy}$$

$$c \leq 2x + b \leq d$$

$$\frac{c-b}{2} \leq x \leq \frac{d-b}{2}$$

$$\downarrow$$

$$\int \int g(u, v) \frac{du}{dv}$$

$$c \leq 2x^2 + b \leq d$$

$$\frac{c-b}{2} \leq x^2 \leq \frac{d-b}{2}$$

if $x > 0$

$$\sqrt{\frac{c-b}{2}} \leq x \leq \sqrt{\frac{d-b}{2}}$$

$x < 0$

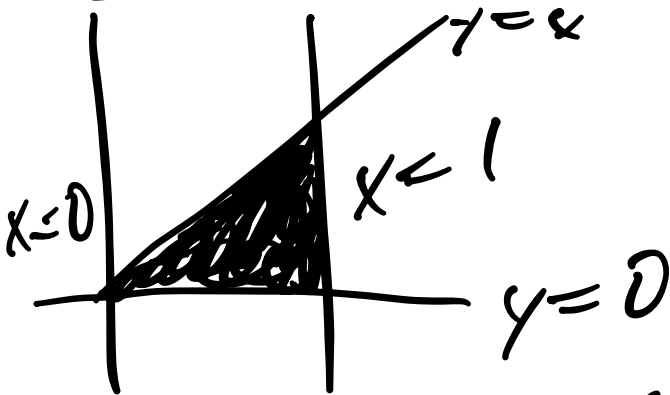
$$-\sqrt{\frac{d-b}{2}} \leq x \leq -\sqrt{\frac{c-b}{2}}$$

Working with inequalities end

changes of variables

$$x^2 - 4 \geq 0 \Rightarrow x \geq 2 \text{ or } x \leq -2$$

[Combine inequalities what is it?



finding these bounds &

$$z = f(x, y)$$

graphing the figure

$$\begin{aligned} x &\geq y \\ 0 \leq x &\leq 1 \\ y &\geq 0 \end{aligned}$$

$$\int_0^1 \int_0^x \dots$$

Absolute Values & translation into inequalities

$$|x - y| \geq 1 \Rightarrow x - y \geq 1 \text{ or } x - y \leq -1$$

$$|x - y| = 1 \Rightarrow \begin{aligned} x - y &= 1 \\ x - y &= -1 \end{aligned}$$

Graphing:

graphing quadratics, linear

$$\begin{cases} z^2 = x^2 + y^2 \\ z = x + y \end{cases} \quad \begin{aligned} &2x^2 + bxy + cy^2 \\ &+ dx + ey + f = 0 \end{aligned}$$

$$2x^2 + 6xy + 4y^2 + d \underbrace{z^2}_{=0} \quad 2x \quad 2y \quad = 0$$

$$x^2 + y^2 + z^2 = 1$$
$$\leq 1$$

worst case scenario

be comfortable in doing this in 2D

$\hookrightarrow \left. \begin{aligned} y &= x^2 \\ y &= 2x^2 + 6 \\ 2x^2 + bxy + cy^2 + d &= 0 \end{aligned} \right\} \text{graph all of these}$

Trigonometry

Brush up on trig substitutions
used in Calc 1/2

What sin, cos, tan
Trig identities

$$\sin^2 \theta + \cos^2 \theta = 1$$

Div by \sin^2 , \cos^2

Calc 1/2: 1 angle

Calc 3: 2 angles

general

$$\begin{cases} \sin(\theta + \gamma) = \sin \theta \cos \gamma + \cos \theta \sin \gamma \\ \cos(\theta + \gamma) = \cos \theta \cos \gamma - \sin \theta \sin \gamma \end{cases}$$

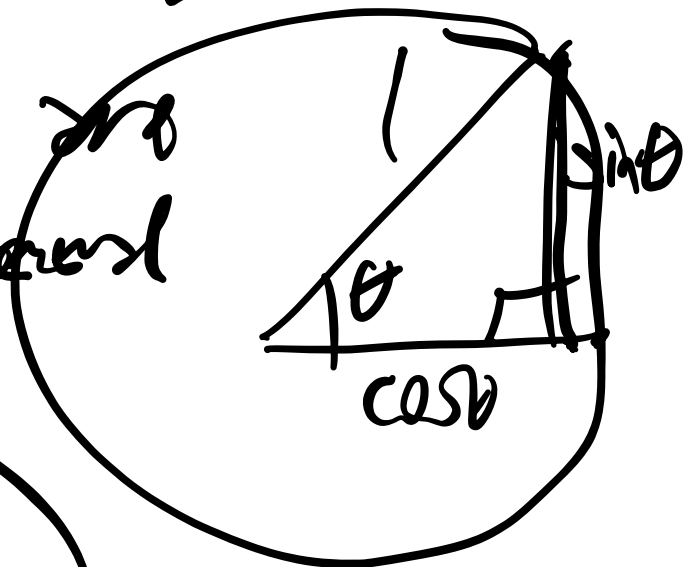
set: $\gamma = \theta \Rightarrow$ double angle identities

Some other identities, like $\sin 2\theta = \dots$

$$\sin\left(\theta + \frac{\pi}{2}\right) = \dots$$

$$\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta$$

for example,
you end up here



$$d^2 = \overbrace{(\sin^2 \theta \sin^2 \gamma + \cos^2 \theta \sin^2 \gamma + \cos^2 \gamma)} \\ \sin^2 \theta \sin^2 \gamma + \cos^2 \theta \sin^2 \gamma + \cos^2 \gamma = \\ \underline{(\sin^2 \theta + \cos^2 \theta) \sin^2 \gamma} + \cos^2 \gamma = \\ \sin^2 \gamma + \cos^2 \gamma = 1$$

$$d^2 = 1 \Rightarrow d = 1 \text{ as } d > 0$$

Know x, y well to use x, y, z
 Know θ well to use θ & ϕ

analogy of analogy: anything in (x, y, z)
 done with 12 variables, you need
 to be comfortable with \Rightarrow you
 can do it with 2(3) variables resp.

$$\sum \frac{1}{n^2} \rightarrow \sum_{m, n} \frac{1}{m^2 n^2}$$

not everything will be generalized

$$d((x, y), (a, b)) = \sqrt{(x-a)^2 + (y-b)^2}$$

$$d((x, y, z), (a, b, c)) = \sqrt{\dots}$$

$$\left[\frac{2\sqrt{(\text{trig})^2} + \sqrt{\text{trig}^2} + \sqrt{\dots}}{\dots} \right] =$$

math 24 (or) Calculus I ~
Calc AB

math 242 ~ Calculus II
~ Calc BC

AP slightly ~~more~~ than college

Calc I: almost everything

$$\int \sec x = \tan x$$

$$\int \sec^3 x$$

$$\int x \ln x$$

$$\int \ln x$$

$$\int \ln x$$

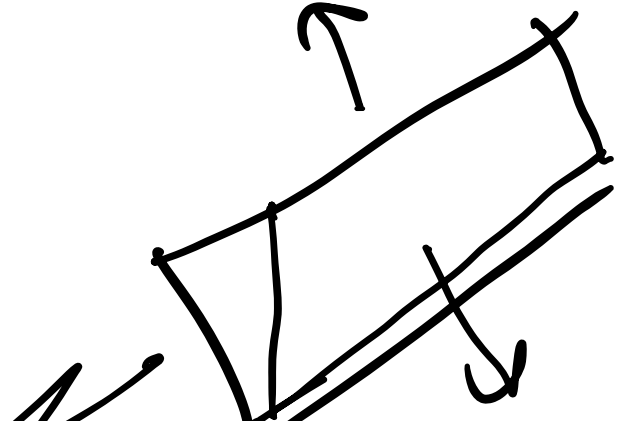
$$\int \cos x e^{bx}$$

$$\int x^4 \ln x$$

$$\int \frac{2x^2 + 6x + c}{6x^2 + 18x + 9}$$

ex. of units: may or may not come up again

- related rates
- linear approx. error
- solids of revolution
- work problems in physics



Calculus II:

if you're low on time have
a lot to catch up on, skip:

- Sequences
- Series
- Limit of a_1, a_2, a_3, \dots
- Convergence Tests

last 1/2 of Calc 2

General concept: manipulating
equations, simplifying expressions,
canceling out things, factoring things
most fundamental concept

Upload steps:

have phone already plugged into
laptop w/ laptop viewing
files on phone

make sure camera rolls, mails
are taken & picture, laptop recogn-
izes it

leave your phone behind your
laptop screen

ctrl - click or highlight
to select multiple photos
at once