

# A3SR Math Review Resources/Links

## General Review of Statistics

[https://www.youtube.com/playlist?list=PL8dPuuaLjXtNM\\_Y-bUAhblSAdWRnmBUcr](https://www.youtube.com/playlist?list=PL8dPuuaLjXtNM_Y-bUAhblSAdWRnmBUcr)

## Properties of Logarithms

[https://mcckc.edu/tutoring/docs/bt/exp\\_rad\\_log/Logarithms\\_and\\_Their\\_Properties.pdf](https://mcckc.edu/tutoring/docs/bt/exp_rad_log/Logarithms_and_Their_Properties.pdf)

Basics: [https://www.youtube.com/watch?v=9c6-aQGfY\\_E](https://www.youtube.com/watch?v=9c6-aQGfY_E)

Natural Log: <https://www.youtube.com/watch?v=fZdWSlXkKzY>

## Matrix Algebra

<https://www.math.hmc.edu/calculus/tutorials/matrixalgebra/>

<https://www.stat.washington.edu/adobra/classes/536/Files/week1/matrixfull.pdf>

[https://www.youtube.com/playlist?list=PLZHQObOWTQDPD3MizzM2xVFitgF8hE\\_ab](https://www.youtube.com/playlist?list=PLZHQObOWTQDPD3MizzM2xVFitgF8hE_ab)

## Derivatives

Basic review: Limits: <https://www.youtube.com/watch?v=HYSI-AHUqRM> Understanding the Definition of the Derivative: <https://www.youtube.com/watch?v=2wH-g60EJ18&t=181s> Finding a Derivative Using the Definition of a Derivative: <https://www.youtube.com/watch?v=vzDYOHEtFlo> <https://www.khanacademy.org/math/differential-calculus>

[http://tutorial.math.lamar.edu/pdf/Calculus\\_Cheat\\_Sheet\\_Derivatives.pdf](http://tutorial.math.lamar.edu/pdf/Calculus_Cheat_Sheet_Derivatives.pdf)

<http://tutorial.math.lamar.edu/Classes/CalcI/DerivativeIntro.aspx>

Chain Rule: <https://www.youtube.com/watch?v=gt22FmU3bv4&list=PLDE077A2EC488104D&index=16>

Quotient Rule: <https://www.youtube.com/watch?v=K3MxofAF-9o&list=PLDE077A2EC488104D&index=22>

## Integrals

<http://tutorial.math.lamar.edu/Classes/CalcI/IntegralsIntro.aspx>

<https://www.cliffsnotes.com/study-guides/calculus/calculus/integration/definite-integrals>

<https://www.cliffsnotes.com/study-guides/calculus/calculus/integration/antiderivatives-indefinite-integrals>

U-Substitution: <https://www.youtube.com/watch?v=nLKcIKbNK3Q>

More U-Substitution: <https://www.youtube.com/watch?v=QNMErMqnnqY>

Integration by Parts: <https://www.youtube.com/watch?v=dqaDSlYdRcs>

## Variables: Types and Summaries

Download OpenIntro Statistics (4th edition): <https://leanpub.com/openintro-statistics>

Note: you can download the PDF for free or choose to pay any amount

OpenIntro statistics: Chapter 1.1-1.2 (pgs 8-21), Chapter 2.1-2.2 (pgs 39-78)

#Basic Probability

OpenIntro statistics: Chapter 3.1-3.2 (pgs 80-111)

## Random Variables and Probability Density/Mass Functions

Random Variables, Expectation/Variance: OpenIntro statistics: Chapter 3.4-3.5 (pgs 115-130)

Probability Distributions: OpenIntro statistics: Chapter 4-3.5 (pgs 132-167) (this covers the normal, geometric, binomial, negative binomial, and poisson distributions. Normal is the most important to review; the others will be covered in Probability, but it can't hurt to review them beforehand if you have time)

<https://www.youtube.com/watch?v=oHcrna8Fk18&list=PLvxOuBpazmsNIHP5cz37oOPZx0JKyNszN>

Expected Value: <https://www.youtube.com/watch?v=VyK8HQOckIE>

## Sampling Distributions

<https://www.khanacademy.org/math/statistics-probability/sampling-distributions-library/what-is-a-sampling-distribution/v/introduction-to-sampling-distributions?modal=1> [http://onlinestatbook.com/2/sampling\\_distributions/intro\\_samp\\_dist.html](http://onlinestatbook.com/2/sampling_distributions/intro_samp_dist.html) (also has notes on CLT)

<https://www.youtube.com/watch?v=DmZJ1blQOns>

## Central Limit Theorem Introduction

OpenIntro statistics: Chapter 5.1-5.2 (pgs 170-188)

## Hypothesis testing: Z-Tests, T-Tests, and P-Values

Hypothesis Testing: OpenIntro statistics: Chapter 5.3 (pgs 189-205) (in the 4th edition, hypothesis testing is introduced in the context of proportions; for examples of hypothesis testing with the sample mean, see <http://www.ltcconline.net/greenl/courses/201/hyptest/hypmean.htm>)

T-Tests: OpenIntro statistics: Chapter 7.1-7.3 (pgs 250-277)

P-value: <https://www.youtube.com/watch?v=UsU-O2Z1rAs>

T-Distribution (more technical): <https://www.youtube.com/watch?v=T0xRanwAlil>

T-Distribution (less technical): <https://www.youtube.com/watch?v=Uv6nGIgZMVw>

T-Tests: <https://www.youtube.com/watch?v=T9nI6vhTU1Y>

## Correlation and Covariance

<https://web.stanford.edu/class/archive/cs/cs109/cs109.1178/lectureHandouts/150-covariance.pdf>

OpenIntro statistics: Section 8.1.4 (pgs 310-312)

<https://www.youtube.com/watch?v=KDw3hC2YNFc>

# Ordinary Least Squares Regression

OpenIntro statistics: Chapter 8.1-8.2 (pgs 305-327)  
<https://www.youtube.com/watch?v=coQAAN4eY5s>