Nashua Community College	**Online tutoring for MATH 106N students** **www.khanacademy.org**

WHAT IS KHAN ACADEMY? www.khanacademy.org

Khan Academy is a free, online, educational community which offers lessons, videos, and so much more in a variety of subjects. Many students use Khan Academy as a supplemental resource to learn and reinforce their math skills. Each topic has a group of videos and exercises to help explain what it is and how to do it, like a teacher would in a classroom. These exercises reflect what is taught in the videos and can be done as many times as you'd like.

USING KHAN ACADEMY

To start learning and find what you're looking for, check the playlist below and then search for things in the **search bar** of Khan Academy. When you search for something, you will notice that it could reference a Video (represented by ▸ on the playlist) or a Skill (represented by ☆ on the playlist). So if you're looking to learn how to add and subtract negative numbers, you can search for the video "Adding numbers with different signs" (which is 5 minutes and 33 seconds long); make sure when you find it that it brings you to a video. If you then want to practice exercises relating to this topic, you can then search for "Adding and subtracting negative numbers" which is an exercise set with 3-5 problems in it.

"What to Search" is what you type in the search bar. What you are looking for is written exactly as shown here and is case-sensitive; remember that a ▸ symbol means "Video" and a ☆ symbol means "Skill".

Topics	What to Search
-Basic Probability Flipping coins, pulling cards from a deck, rolling dice… Generating a Sample Space Compound Events Venn Diagrams P(A or B) = P(A) + P(B) - P(A and B) Dependent Probability P(A and B) ≠ P(A) · P(B) Independent Probability P(A and B) = P(A) · P(B) Conditional Probability $P(A\|B) = \dfrac{P(AandB)}{P(B)}$ $P(B\|A) = \dfrac{P(AandB)}{P(A)}$ **-Permutations and Combinations** Heads and Tails Possibilities Picking Cards	▸ Probability explained (8:17) ▸ Finding probability example (2:55) ✶ Simple probability ▸ Experimental probability (6:54) ✶ Experimental probability ▸ Making predictions with probability (5:04) ✶ Making predictions with probability ▸ Probability from compound sample space (5:02) ✶ Probabilities of compound events ▸ Addition rule for probability (10:42) ✶ Adding probabilities ▸ Analyzing event probability for independence (6:47) ✶ Identifying dependent and independent events ▸ Analyzing dependent probability (9:29) ✶ Multiplying dependent probabilities ▸ Permutation formula (7:34) ▸ Possible three letter words (5:38) ▸ Example: Ways to arrange colors (3:44) ✶ Permutations ▸ Combination formula (11:16) ▸ Handshaking combinations (7:28) ▸ Example: 9 card hands (7:42) ✶ Combinations ✶ Permutations and combinations ▸ Example: All the ways you can flip a coin (2:13) ▸ Exactly three heads in five flips (6:51) ▸ Example: Combinatorics and probability (10:50) ✶ Probability with permutations and combinations

-Discrete Probability Random Variables Expected Value Binomial Distribution	▸ Random variables (5:31) ▸ Discrete and continuous random variables (11:56) ▸ Constructing a probability distribution for random variable (6:47) ✭ Constructing probability distributions ▸ Getting data from expected value (9:51) ✭ Expected value ✭ Expected value with empirical probabilities ▸ Expected profit from lottery ticket (9:17) ✭ Expected value with calculated probabilities ▸ Binomial distribution (11:51) ▸ Visualizing a binomial distribution (9:26) ▸ Free throw binomial probability distribution (8:38)
-Descriptive Statistics Mean **μ**, Median, Mode, Range Variance σ² Standard Deviation σ Sample Variance S^2 Sample Standard Deviation S	▸ Finding mean, median, and mode (3:54) ✭ Mean, median, and mode ▸ Range, variance and standard deviation as measures of dispersion (12:33) ▸ Variance of a population (8:04) ▸ Sample variance (10:37) ✭ Sample and population variance ▸ Population standard deviation (8:04) ▸ Sample standard deviation and bias (9:32) ✭ Standard deviation of a population ✭ Sample and population standard deviation
-Normal Distribution Perfect Bell Curve (100%) z-score – "How many standard deviations from the mean" $$\frac{X - \mu}{\sigma}$$	▸ ck12.org normal distribution problems: Qualitative sense of normal distributions (10:52) ▸ ck12.org normal distribution problems: Empirical rule (10:24) ▸ ck12.org normal distribution problems: z-score (7:47) ▸ ck12.org exercise: Standard normal distribution and the empirical rule (8:15) ✭ Empirical rule ▸ ck12.org: More empirical rule and z-score practice (5:56)

Empirical Rule (68-95-99.7) 68% is one standard deviation to and from the mean 95% is two standard deviations to and from the mean 99.7% is three standard deviations to and from the mean **-Central Limit Theorem** Sampling distribution of the sample mean $\sigma_X{}^2 = \dfrac{\sigma^2}{n}$ and $\sigma_X = \dfrac{\sigma}{\sqrt{n}}$ **-Confidence Intervals** Sample Size Bernoulli Distribution **-Hypothesis Testing** **-Correlation and Regression** Scatter Plots Fitting a Line to Data	✪ Z-scores 1 ✪ Z-scores 2 ✪ Z-scores 3 ▸ Central limit theorem (9:48) ▸ Sampling distribution of the sample mean (10:51) ▸ Sampling distribution of the sample mean 2 (13:19) ▸ Standard error of the mean (15:14) ▸ Sampling distribution example problem (14:27) ▸ Confidence interval 1 (14:02) ▸ Confidence interval example (18:35) ▸ Small sample size confidence intervals (11:10) ▸ Mean and variance of Bernoulli distribution example (8:19) ▸ Bernoulli distribution mean and variance formulas (6:58) ▸ Margin of error 1 (15:02) ▸ Margin of error 2 (10:04) ▸ Simple hypothesis testing (6:24) ✪ Simple hypothesis testing ▸ Statistical significance on bus speeds (11:35) ✪ Hypothesis testing in experiments ▸ Studying, shoe size, and test scores scatter plots (2:25) ▸ People smoking less over time scatter plot (2:34) ✪ Interpreting scatter plots ▸ Constructing a scatter plot (2:31) ▸ Constructing scatter plot exercise example (1:57) ✪ Constructing scatter plots ▸ Fitting a line to data (7:47) ▸ Regression line example (9:26)