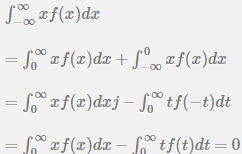
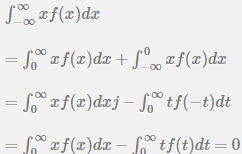
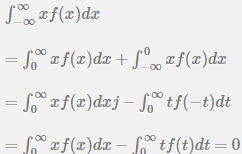
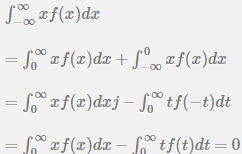
**QUIZ**

* P(B∩Ac) is always equal to?
* **P(B)−P(B∩A)**
* When does *P*(*A*∪*B*) = *P*(*A*) + *P*(*B*)? Check all that apply.
* **When P(A∩B)=0**
* ~~When A and B are independent.~~
* ~~Always~~
* **When A and B are mutually exclusive (*same as statement 1)***
* What is the probability of getting at least 1 head on 3 coin flips expressed as a % to one decimal?
* P(HTT ∪ HHT ∪ HHH) 🡪 equals sum of probabilities ONLY when events are *mutually exclusive*
* *Otherwise* it equals probability each minus other things (intersections)
* **P(at least one) = 1 – P(none)** 🡪 1 – P(all tails) = 1 – P(½^3) = 1 - .125 = .875 = **87.5**
* Suppose a random variable, X, follows a uniform distribution (i.e. has a density that is a constant 1 between 0-1. What is the probability X is between .1-.7, expressed as an integer % (no decimals)?
* Integrate 1 from .1 to .7 🡺  🡺 .7 - .1 = .6 **= 60%**
* Suppose a random variable follows a density **cx** for 0≤x≤1. What is c?
*  🡺 **c = 2**
* Suppose a density is of the form  for x between 0-1. What is the distribution function associated with this density?
* INTEGRATE! **🡪 x^3** 🡺
* Suppose the time in days until hospital discharge for a certain patient population follows a density for x>0. Calculate probability a person takes longer than 11 days to be discharged. Express it as an integer percentage with no digits after the decimal.
* **Integrate the function from 11 to infinity 🡪** 
* Derivative/integral of e^-x/10 = -e^(-x/10) 🡺 
* Multiply by 100 for %
* Suppose **h** is a **real valued** function such that h≥0 and . Then ch is a valid density when c is equal to?
*  🡺 b/c *integral of h(x)c over all real #’s must = 1*
* *Something < 1 multiplied by its inverse = 1*
* 
* Consider a health care worker without the flu. Suppose they have a p=.01 probability of getting infected after an examination of an infected patient. His chance of getting infected after the ith interaction is assumed to be for i=1,2,…. What is the probability of getting infected after 3+ interactions expressed as to the nearest integer percentage? (no decimal places.)
* **P(X >= 3) = 1 – P(not >= 3) 🡺 1 – P(2) – P(1) 🡺 1 - .01 - .0099 == .9801 = 98%**
* Consider a **geometric random variable**, X which has **mass function** for x=1,2,…. (assume this sums to 1 so that its valid) What is the probability X>5?
* **Sum the function from 6 to infinity** 
* **Factor out a (1-p)^5 == subtract 5 from the formula w/in the sum**
* **Subtract 5 from the exponent + the lower bound of the sum**
* Let **g(x)=πf1(x) + (1−π)f2(x)** where f1 and f2 = densities w/ means μ1 and μ2 + associated variances σ1^2 and σ2^2, respectively. Here 0≤π≤1. Note that *g is a valid density*. What is E[X2] where X is a random variable having density g?
* 
* **Therefore,** 
* Suppose a density is of the form  for some constant k>1 and that 0≤x≤1. What is where **n** is an integer and **X** is a random variable from this density?
* 
* You are playing a game with a friend where you flip a coin and if it comes up heads you give her two dollars and if it comes up tails she gives you one dollar. You play the game ten times. What is the expected total earnings for you?
* P(H)\*winning/loss + P(T)\*winnings/loss = P(H)\*-2 + P(T)\*1 = P(T) – 2P(H) = ½ - 2\*(½) 🡪 10(½ - 2\*(½)) = 10(-½) = -5 🡺 **Loss of five dollars**
* 
* When at the free-throw line, a player makes at least 1 free throw 90% of the time. 80% of the time, the player makes the 1st shot, while 70% of the time she makes both shots. Does it appear that the player's second shot success is independent of the first?
* **No 🡪** A = makes 1st shot, B = makes 2nd shot **🡪** P(A∪B) = .9**,**P(A)=.8, P(A ∩ B) = .7
* Then P(B) = P(A∪B) − P(A) + P(A∩B) =.8
* **Then, P(A∩B) ≠ P(A)×P(B)**
* Let X be a random variable with mean μ and variance σ^2. What is the variance of ?
* 
* Let X1,…,Xn1 be random variables independent of Y1,…,Yn2, where both groups are iid with associated population means μ1 and μ2 and population variances σ1^2 and σ2^22, respectively. Let X¯ and Y¯ be their sample means. What is the mean of X¯− Y¯?
* **μ1−μ2 🡪** 
* The Poisson mass function is given by  for x=0,1,2,3,… and λ>0. What is **E[X(X−1)]** where X is a Poisson random variable?
* 
* 
* Let f be a density such that f(x)=f(−x). What is the associated mean of this density (assuming that it has a mean)?
* 
* 
* For a Bernoulli coin flip w/ P(H) = p, what is the value of p that yields the largest variance?
* Variance = 
* Derive = , which, solving for p = 0, gives p = .5
* A 2nd derivative = 2 suggests the function is **concave (**f’’ > 0), and p = .5 == the max (gradient = 0 @ p = .5)
* Let f be a mean 0 variance 1 density. Let g(x)=f{(x−μ)/σ}/σ. Argue to yourself that g is a valid density. What is the variance associated with g?
* 
* 
* 
* So, the mean associated w/ g is = μ, then considering the variance:
* 
* 