Distributions

Theory	Examples	Easy Facts	For Dummies	Mathematicians
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400

Player A

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Theory for 100.

Formula for $F(x)$ the distribution function of the continuous r.v. X with density $f(x)$

a $P[x \geq X]$

b $\int_0^\infty t f(t)\, dt$

c $\int_{-\infty}^x t\, dt$

d $\int_x^\infty f(t)\, dt$

e none of above

f all of above including the previous answer

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Theory for 200.

Density for an exponential random variable

a $f(x) = \lambda e^{\lambda \cdot (-x)}$ if $x \geq 0$ and otherwise

b $f(x) = -\lambda e^{-\lambda x}$ if $x < 0$ and otherwise

c $f(x) = -\lambda e^{-\lambda \cdot (-x)}$ if $x \geq 0$ and otherwise

d $f(x) = \lambda e^{-\lambda x}$ if $x < 0$ and otherwise

e $f(x) = x e^{-\lambda x}$ if $x \geq 0$ and otherwise

f $f(x) = x e^{\lambda x}$ if $x < 0$ and otherwise

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Theory for 300.

What is true about F the distribution and f the density of a continuous r.v. X?

a $f' = F$

b $\int_{-\infty}^{x} F(x)\,dx = f(x)$

c $F(x) = f(x) - f(0)$

d $f(t) = \int F(t)$

e $f(t) = F'(t)$

f none of the above

g all of the above

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Theory for 400.

If $\alpha = \int_{-\infty}^{\infty} e^{-x^2}\, dx$, What is α^2?

a 1

b $\sqrt{2}$

c Perimeter of a equilateral triangle

d The distance from here to the end of the universe

e Area of a unit circle

f All of the above answers

g None of the above answers

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Examples for 100.

An example of a discrete random variable

a normal

b exponential

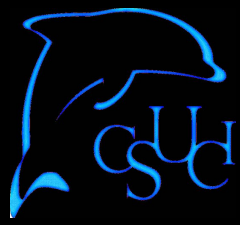
c gamma

d uniform continuous

e geometric

f all of the above

g none of the above



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Examples for 200.

If $\Omega = \{1, 2, 3, 4\}$ an example of two independent sets

a	$\{1, 2, 3, 4\},\ \{\}$
b	$\{1, 2\},\ \{3, 4\}$
c	$\{1, 2, 3\},\ \{2, 4\}$
d	$\{2, 3\},\ \{3, 2\}$
e	$\{1, 3\},\ \{2, 4\}$
f	none of them

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Examples for 300.

An example of an decreasing sequence of sets is

a $\{[1/n, \infty)\}$

b $\{[-n, \infty)\}$

c $\{[1/n, n)\}$

d $\{[-n, n)\}$

e $\{[1 - 1/n, 10)\}$

f $\{[0, n)\}$

g none of them

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Examples for 400.

An example of a sigma algebra $\mathbb{X}$ is

a $\mathbb{X} = \{\emptyset, X, A\}$

b $\mathbb{X} = \{\emptyset, X, A, B\}$

c $\mathbb{X} = \{\emptyset, X, A^c, B^c\}$

d $\mathbb{X} = \{(a, b) \ : a, b \in \mathbb{R}\}$

e $\mathbb{X} = \{\emptyset, X, B, B^c\}$

f none of them

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Easy Facts for 100.

20 students take Spanish 402, 17 students take Math 352, 5 take both. How many students in total there are?

a 37

b -4/3

c 103

d 27

e 32

f Hannah Montana

g none of them

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Easy Facts for 200.

Density for binomial random variable with 5 trials and probability of failure 1/2?

a $f(k) = \binom{k}{5} k^2 \cdot 2^k$

b $f(k) = \binom{5}{k} 1/2^5 \cdot 1/2^k$

c $f(k) = \binom{k}{5} 2^{-5} \cdot 2^{-k+5}$

d $f(k) = \binom{5}{k} 64/2$

e $f(k) = \binom{28}{37}$

f none of them

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Easy Facts for 300.

If $x = r\cos\theta,\ y = r\sin\theta$ then the Jacobian is

a $\cos^2\theta + \sin^2\theta$

b $\dfrac{51r^2}{(17)(3r)}$

c $\cos^2\theta - \sin^2\theta$

d $-r\sin\theta + 192378$

e $r^2\cos\theta^2$

f 1

g none of them

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Easy Facts for 400.

If f, F are density and distribution function respectively, what does $\int_2^\infty f(x)\,dx$ represent?

a	$P[X < 2]$
b	$F(2)$
c	$1 - F(2)$
d	$F'(2)$
e	$P[2 > x]$
f	$f(2)$
g	none of them

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For Dummies for 100.

About the following statement $P(A \cup B) = P(A) \cup P(B)$

a. You need to subtract the probability of the intersection

b. True only if the sets are disjoint

c. A needs to be a subset of B

d. It is always true

e. Only dumb people will write those statements

f. all of the above

g. none of above

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For Dummies for 200.

Mention four discrete distributions

a. Poisson, Binomial, Exponential and Normal

b. Normal, Bernoulli, Poisson and Geometric

c. Uniform Discrete, Bernoulli, Poisson and Normal

d. Exponential, Bernoulli, Geometric and Binomial

e. Uniform continuous, Exponential, Normal and Gamma

f. Binomial, Geometric, Poisson and Bernoulli

g. none of them

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For Dummies for 300.

What is $P(A|B)$?

a $P(A)/P(B)$

b $P(B)/P(A)$

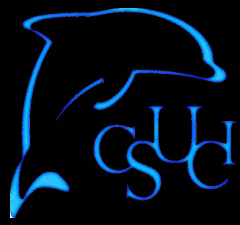
c $P(A) \cdot P(B)$

d $P(A \cap B)$

e I don't give a dime

f $P(A \cup B)$

g none of them



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For Dummies for 400.

What is $(A \cap B)^c$ equal to?

a $(A \cup B)^c$

b $(A \cap B)$

c $A^c \cap B$

d $A \cup B^c$

e $A^c \cap B^c$

f $A^c \cup B^c$

g none of them

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Mathematicians for 100.

Flipping a coin is associated with ...

a Bernoulli

b Poisson

c Bonferoni

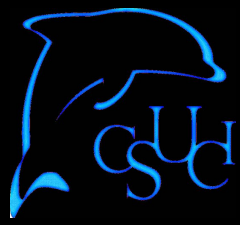
d Buffon

e Jacob

f Bayes

g DeMorgan

h Venn



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Mathematicians for 200.

He is related to the complement of a union.

a Bernoulli

b Poisson

c Boole

d Buffon

e Jacob

f Bayes

g DeMorgan

h Venn

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Mathematicians for 300.

He is related to counting number of Pirates arriving to a certain area per unit of time. (famous Pirate?)

a Bernoulli
b Poisson
c Bonferoni
d Buffon
e Jacob
f Bayes
g DeMorgan
h Venn

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Mathematicians for 400.

He is related to the probability of a union of sets (not necessarily disjoint).

- a Bernoulli
- b Poisson
- c Boole
- d Buffon
- e Jacob
- f Bayes
- g DeMorgan
- h Venn

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