

Faculty Applied Computer Science Example Admission Test B.Sc. Artificial Intelligence

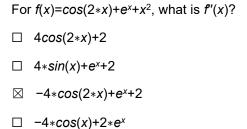
<u>Calculus</u>

Question 1

Given the function $f(x) = (e^x)/(e^x-2)$, what is $f'(x)$?
\boxtimes f'(x)= (-2e ^x)/(e ^x -2) ²
\Box f'(x)= (-2e ^x)/(e ^x -2)
\Box f'(x)= $(2e^x)/(e^x-2)^2$
\Box f'(x)= (-2e ^x)/(e ^x +2) ²
Question 2
Given the function $f(x)=29x^3+8x^2-12x+22$
What is the slope at point $x = 0$?
□ -22
⊠ -12
□ 12
□ 22
Question 3
What is the derivative of the function $f(x)=sin(2x)-cos(x)$?
$ \Box f(x) = -\cos(x) + \sin(x) $
$\Box f'(x) = \cos(2x) - \sin(x)$
$\Box f'(x) = -2\sin(x) + \cos(x)$

 \boxtimes f'(x) = 2 cos(2x) + sin(x)

Question 4



Foundations of Computer Science

Question 5

Given is the following algorithm:

Method trib(n)

If n = 1 or n = 2

return 0

Else If n = 3

return 1

Else

return trib(n-1) + trib(n-2) + trib(n-3)

EndMethod

What is trib(4)?

□ 4

□ 0

Question 6

□ 3

A balanced binary tree contains 250 elements. What is the maximum number of comparisons necessary to find an element in the tree?

250

□ 1

⊠ 8

□ 25

Qu	estion 7
Giv	en the following class for a staff management software:
Em	ployer, attributes pid, name, working time, Methods: add working time
Wh	at are suitable data types to the attribute pid? (Several possible)
	float
\boxtimes	Int
\boxtimes	String
	blob
Qu	estion 8
	w can you devise an algorithm that determines for any possible Java program input whether the gram raises a NullPointerException?
\boxtimes	Such an algorithm can not exist
	Build a sophisticated parser for the grammar of Java
	Run topological sorting on the input
	Use machine learning to learn from labeled program inputs
<u>Lir</u>	near Algebra
Qu	estion 9
Giv	ren the planes A1: 4x-2y+z=7 and A2: x+by-3z=2.
Cal	culate b so that A1 and A2 are perpendicular.
\boxtimes	1/2
	0
	1/3
	1
Qu	estion 10
	nts A ($1 \mid 1 \mid 1$) , B ($0 \mid 2 \mid 2$), and C (- $1 \mid 2 \mid 0$) define the plane P. What is the equation of the ne P in point-normal form using A as position vector?
	$2x_1-3x_2-x_3+4=0$
	$-2x_1-9x_2+x_3+4=0$
\boxtimes	$-2x_1-3x_2+x_3+4=0$
	$2x_1-9x_2-x_3+4=0$

Question 11 A man takes a walk with 2 dogs. The angle between the dog leads is 50 degrees. To which angle (approximately) does the man move when one dog has double the power than the other? □ 14.2 ° □ 14° \Box 0 ° ⊠ 13.1° **Question 12** Find the magnitude of vector v = <-3,-2> \boxtimes sqrt(13) □ 5 □ 13 \square sqrt(5) **Probabilities Question 13** A spinning wheel consists of five equally sized sectors. One of the sectors is labeled "0", one is labeled "1", and one is labeled "2"; the other two sectors are labeled "9". The wheel is spun four times. Calculate the probability that the numbers 2, 0, 1, and 9 appear in the specified order. □ 2/125 □ 1/125 ⊠ 2/625 □ 1/625 **Question 14**

An assembly line in a company has an error rate of 2% -- i.e. 2% of all produced components are faulty. Assume that the error rate of randomly selected components follows a binominal distribution. With 50 components selected randomly, what is the probability that at least 6% of the components are faulty?

	12.3%
	10.9%
	8.9%
\boxtimes	7.8%

Question 15

The company InfiChip produces RAM memory chips with the machines M1, M2 and M3. The machines participate in the full production with following portions: M1 40%, M2 50% and M3 10%. The error rate of M1 is 4%, M2 8% and M3 10%.

A arbitrary selected chip is erroneous. What is the probability that it was produced with machine M1
□ 0.6134
⊠ 0.2424
□ 0.3145
□ 0.2525
Question 16
Question 16 Calculate the corrected sample standard deviation for the following sequence 9, 2, 5, 4, 12, 7.
Calculate the corrected sample standard deviation for the following sequence 9, 2, 5, 4, 12, 7.
Calculate the corrected sample standard deviation for the following sequence 9, 2, 5, 4, 12, 7.