Quiz 4 from Fall 2021

STUDENT NAME

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Q1 Explicit Parentheses

5 Points

Make the parentheses in the following lambda expressions explicit:

Note: You may use λ , \backslash , or L to denote the lambda symbol.

Enter your answer here

Save Answer

Q2 Alpha Conversion

2 Points

Select the valid alpha conversions of the following lambda expression:

(λx. x (λa. x a z)) c

(λx. x (λc. x c b)) y

(λc. c (λw. c w b)) y

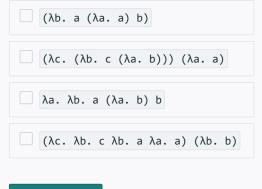
(λw. w (λa. x a b)) y

Save Answer

Q3 Free Variables

2 Points

Select the following lambda expressions that contain free variables.



Save Answer

Q4 β-Reduction

5 Points

Solve the following beta reductions. Show all steps with **explicit parentheses** to receive full points.

Note: You may use λ , \setminus , or L to denote the lambda symbol.

Enter your answer here

Save Answer

Q5 Call-by-Name versus Call-by-Value

6 Points

Recall the reduction strategies call-by-name and call-by-value. Reduce the following lambda expression using the two strategies.

```
(λa.λb.b) ((λc.c) (λd.d))
```

Note: You may use λ , λ , or L to denote the lambda symbol.

Q5.1 Call-by-Name

3 Points

Show the β -Reduction of the expression $(\lambda a.\lambda b.b)$ $((\lambda c.c)$ $(\lambda d.d))$ using **call-by-name**. Show all steps with **explicit parentheses** for full credit.

Enter your answer here

3 Poir	? Call-by-Va its	iue				
	the β-Reduct ps with explic			((λc.c)	(λd.d))	using call-by-value . Show
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