

11.1

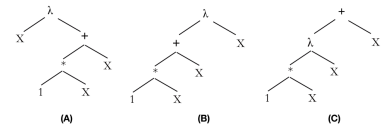
Score: _____

1. Starting with an empty stack, what sequence of operations will yield the string **MIRE** from the incoming string **LIMERICK**. *Note:* It is acceptable for there to still be characters on the stack and/or on the incoming string when your output is complete.

- ☐ A OOOXXOOXXX
- ☐ B OOOXXXOOXX
- ☐ C OOXOXOOXX
- ☐ D OOOXXOOXX
- ☐ E OOOXXOOOX

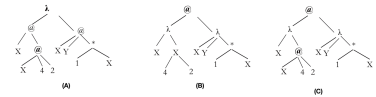
2. Which of the following ASTs is equivalent to $(\lambda x. + (* 1 x) x)$?

- ☐ A A
- ☐ B B
- ☐ C C



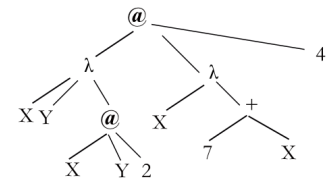
3. Which AST is equivalent to $(\lambda x. x 4 2) (\lambda xy. * 1 x)$?

- ☐ A A
- ☐ B B
- ☐ C C



4. What is the equivalent lambda expression for this AST?

- ☐ A $(\lambda x. + 7 x) (\lambda xy. * x y) 4$
- ☐ B $(\lambda xy. * x y) (\lambda x. + 7 x) 4$
- ☐ C $(\lambda x. + 7 x) (\lambda xy. x y 2) 4$
- ☐ D $(\lambda xy. x y 2) (\lambda x. + 7 x) 4$
- ☐ E $(\lambda xy. x 4 2) (\lambda x. + 7 x) 4$



5. What does this lambda expression evaluate to? $((\lambda xyz. y x z) 1 / 3)$

- ☐ A 3
- ☐ B 1/3
- ☐ C .33
- ☐ D 9
- ☐ E 1/9

6. `x`
`(define x 3)`
`(define y 4)`
`(define x ((lambda (x) (+ x x)) y))`

- ☐ A 3
- ☐ B 4
- ☐ C 8
- ☐ D 6
- ☐ E 7
- ☐ F `x` is a function

7. What is the value for `x` after the following code is executed in Racket?

```
(define x 1)
(define y 2)
(define z 3)
(define addy (lambda (z) (+ z y)))
(define messy (lambda (x z) (+ (addy z) (addy x))))
(messy (addy x) (addy z))
```

- ☐ A 3
- ☐ B 2
- ☐ C 1
- ☐ D 12
- ☐ E 6

8. Given the following expression, which statements are true?

`((lambda (x) (x y z)) (lambda (z) (y z)))`

- ☐ A `x` occurs free; `y` occurs free; `z` occurs both free and bound.
- ☐ B `x` occurs free; `y` occurs both free and bound; `z` occurs bound.
- ☐ C `x` occurs bound; `y` occurs both free and bound; `z` occurs bound.
- ☐ D `x` occurs bound; `y` occurs bound; `z` occurs bound.
- ☐ E `x` occurs bound; `y` occurs free; `z` occurs both free and bound.

9. Given the following expression, which statement is true?

`(lambda (y) (lambda (x) (x y)) (lambda (z) (z y))) y`

- ☐ A `x` occurs bound; `y` occurs free; `z` occurs bound.
- ☐ B `x` occurs bound; `y` occurs both free and bound; `z` occurs bound.
- ☐ C `x` occurs free; `y` occurs free; `z` occurs free.
- ☐ D `x` occurs bound; `y` occurs bound; `z` occurs bound.
- ☐ E `x` occurs both free and bound; `y` occurs both free and bound; `z` occurs both free and bound.