

LISP Programming Worksheet
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School ACSL Club of 2014–2015

You may not need to know all of this material for the next contest! Problems 1 and 2 are representative of problems you may see on contest #2. Problems 3 through 5 are representative of problems you may see on contest #4.

Questions

Evaluate the following LISP code.

1. `(DIV 24 (SUB 2 5))`
2. `(ADD (MULT 48 40)
 (SUB (SQUARE 9) 1)
 (MULT 3 5))`
3. What is the final returned value of the program?

```
(SETQ a 'hello)
(ATOM a)
```

4. What is the final value of `b` after this program is run?

```
(SETQ b '((what) is a list "?"))
(CONS (CAR b) (CDR b))
(SETQ b (CONS (CAR (CAR b)) (CDR b)))
```

5. What is the final returned value of the program?

```
(SET 'c '(21 22 23 50))
(SETQ d (CONS 33 (CDR (CDR c))))
(REVERSE d)
```

Answers

1. (DIV 24 -3)
-8

2.

```
(ADD (MULT 48 40) (SUB 81 1) (MULT 3 5))  
(ADD 1920 80 15)  
2015
```

3.
(SETQ a 'hello) Set variable **a** to symbol **hello**.
(ATOM a) Returns true, since **a** is not a list.

4.
(SETQ b '((what) is a list "?")) Set variable **b** to list containing elements: (a) A list containing one element, the symbol **what**. (b) The symbol **is**. (c) The symbol **list**. (d) The string **"?"**.

(CONS (CAR b) (CDR b)) Returns the list ((what) is a list "?") (the exact same list).

(SETQ b (CONS (CAR (CAR b)) (CDR b))) Changes the value of the first element in **b** to the first element in the list (what), the symbol **what**.

Therefore, the value of **b** is (what is a list "?").

- 5.
- | | |
|---|---|
| <code>(SET 'c '(21 22 23 50))</code> | Set variable <code>c</code> to list containing elements 21, 22, 23, and 50. |
| <code>(SETQ d (CONS 33 (CDR (CDR c))))</code> | Set variable <code>d</code> to list containing elements 33, 23, and 50. |
| <code>(REVERSE d)</code> | Returns (50 23 33). |