

## On the Subject of Arithmelogic

*(Math is fun)  $\vee$  (Bomb is armed) = True.*

- This module contains four buttons, each with a symbol on it, and three displays with four numbers each.
- Each of the three buttons' symbols within the three-element logic statement corresponds to a certain value, as shown on Table A.
- The fourth button, the submit button, has a symbol that corresponds to a condition, also on Table A. Numbers that meet that condition are considered TRUE, others are considered FALSE.
- You can cycle through each display's numbers by pressing the button directly below it. At least one of the numbers in each display, when added to the associated symbol's value, will make that element true, and at least one will make it false. To submit an answer, press the button that is not within the logic statement.
- **IMPORTANT:** When submitting, the displayed number for an element will be added to the symbol's value before the three-element statement is evaluated. The parenthetical statement will be evaluated first.
- If, when submitting, the statement as a whole evaluates to true AND, for each final calculated element within the three-element statement, there is no higher number for that button's display which would keep the true/false value of that element the same, the module will be disarmed. Otherwise, a strike will be given.
- As an example, if the submit button's condition were that all numbers ending in 0 were true, a particular symbol equalled 70, and the possible display numbers were 40, 45, 50, and 55, displaying 40 for that symbol, creating a sum of 110, would be incorrect, even if the statement as a whole were true, as 50 would be a higher valid displayed number to add, as it would create a sum of 120.

?			
40	40	40	
? $\vee$ ( ? $\vee$ ? )			

**Table A: Symbols and their meanings**

Symbol	Value if in statement	Condition if submit button
©	The submit symbol's position in the manual's table (1 being this symbol)	The number is even
Ʒ	The earliest position of the serial number's letters in the English alphabet (e.g. if bomb's serial number is FP4KJ6, use F's alphabetical position)	The number is a multiple of 7 or 13
★	The average of all of the serial number's digits, rounded up	The number modulo 3 = 1
Ж	The number of indicators	The number is prime
И	The number of battery holders	Any of the number's digits are odd
€	The number of lit indicators times three	The number modulo 5 = 2 or 4
᠐	The day of the month when the bomb was activated	The number's digits add up to 9, 10, 11, 12 or 13
A	The lowest digit in the serial number plus five	The number's last two digits are within two of each other
æ	The total number of ports	The number modulo 7 = 1, 3, or 6
ʔ	The number of unlit indicators times four	The number contains a 3 or 6
Ɔ	The number of consonants in the serial number times five	The number's digital root is odd

**Table A cont'd**

Symbol	Value if in statement	Condition if submit button
Ä	The number of batteries	The number is a multiple of 4
€	The sum of the serial number's digits	The number's digits add up to an odd number
Æ	The latest position of the serial number's letters in the English alphabet (e.g. if bomb's serial number is FP4KJ6, use P's alphabetical position)	The number is odd
Q	The total number of modules on bomb modulo 25	The number's digits don't add up to 7, 8, 9, 10 or 11
Q	The number of vowels in the serial number times six	The number is a multiple of 6
ζ	The number of batteries plus the number of indicators	The number's digital root is even
Θ	The number of lit indicators plus the number of port plates	The number is composite
λ	The number of port plates	The number's digits add up to an even number
€	The highest serial number digit	The number contains a 2 or 9
☆	Fifteen	The number modulo 4 = 1
œ	The number of unlit indicators plus the number of battery holders	The number's last two digits are at least five apart

## Appendix of Things to Know

### Logical Connective Symbol List

Logical Connective	Symbol	Logic Gate Equivalent	Meaning
Conjunction	$\wedge$	AND	Returns true if all inputs are true. Else returns false.
Disjunction	$\vee$	OR	Returns true if any input is true. Else returns false.
Exclusive Disjunction	$\underline{\vee}$	XOR	Returns true if exactly one input is true. Else returns false.
Alternative Denial	$\mid$	NAND	Returns false if all inputs are true. Else returns true.
Joint Denial	$\downarrow$	NOR	Returns false if any input is true. Else returns true.
Biconditional	$\longleftrightarrow$	XNOR	Returns false if exactly one input is true. Else returns true.
Implication (Left)	$\longrightarrow$	-	Returns false when left input is true and right input is false. Else returns true.
Implication (Right)	$\longleftarrow$	-	Returns false when left input is false and right input is true. Else returns true.

- Modulo is the remainder from a division problem; 10 modulo 3 is 1.
- The digital root is the continual summing of a number's digits until the result is a single digit number from 0 to 9.
- Vowels are A, E, I, O, and U.
- Prime numbers from 2 to 200 are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, and 199. If your number is greater than 200, the first thousand prime numbers can be found [here](https://primes.utm.edu/lists/small/1000.txt) (<https://primes.utm.edu/lists/small/1000.txt>). Integers greater than 3 that are not prime are composite.