# Homework #1

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## Problem #1

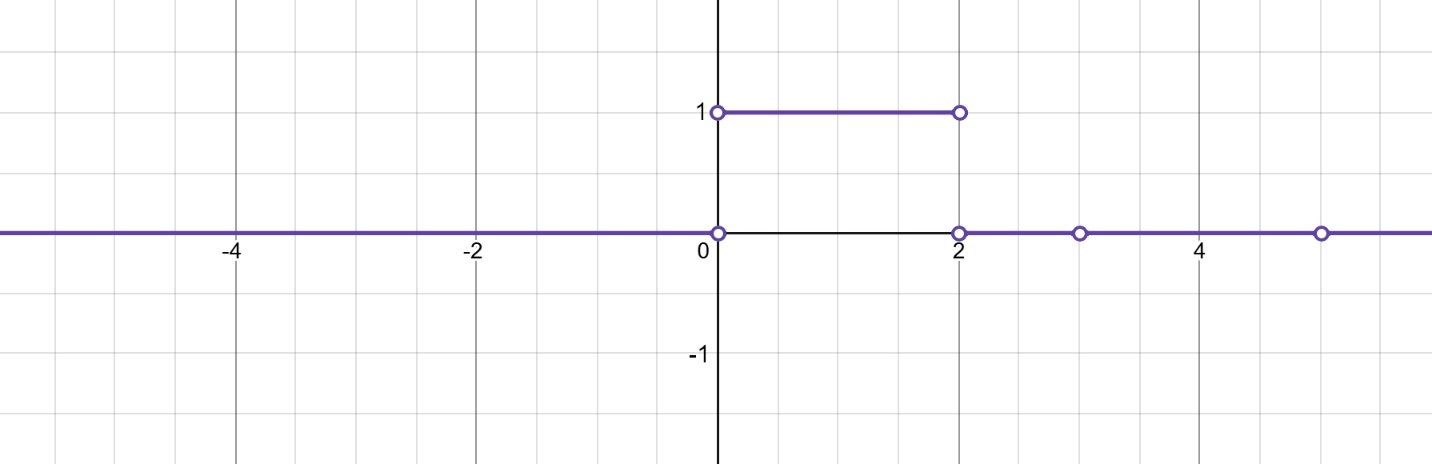
1. is defined for alland is therefore non-causal. We can also determine that it is neither even nor odd, since and . However, behaves periodically since it expands to , and these are both periodic functions with the same frequency. Lastly, because is periodic, defined for all , and has nonzero values, it cannot be an energy signal. Integration further backs this: , but . Therefore, it is a power signal.
2. is defined for all (though it is zero for those values) and is therefore non-causal. We also can see that it is neither even nor odd, since and . This function is not periodic because there is no value *T* such that for . Lastly, since is not periodic and grows unbounded for , it is neither an energy nor a power signal. The integration again shows this: and .

## Problem #2

The first term of is , which we know is an even function, and the second term is , which is an odd function. The last term can be expanded to using the identity , which is also an odd function. is a power signal because it is defined for all , periodic, and has nonzero values. It has a fundamental period of , so the power of is .

## Problem #3

We know that for , for , and . Now we are ready to make our graph of , which can be seen below. From this graph, we can also see that . Our result is validated by the simple fact that , which yields the following calculation: .



## Problem #4