

# Experiment ‘2\_10\_hybrid\_car\_cost’ Results

December 18, 2025

**Experiment outcome:** SUCCESS

**Bad responses:** 0

**Responses containing assume :** 0

**Resolution attempts:** 1

**Hard fails (resolution):** 0

**Soft fails (resolution):** 0

**Verification attempts:** 1

## Problem Specification

**Problem name:** 2\_10\_hybrid\_car\_cost

**Natural language statement:** Write a method that helps a person decide whether to buy a hybrid car. Your methods’s inputs should be: the cost of a new car, the estimated miles driven per year, the estimated gas price, the efficiency in miles per gallon, the estimated resale value after 5 years. Compute the total cost of owning the car for five years.

**Method signature:** hybrid\_car\_cost(new\_car\_cost: real, miles\_per\_year: real, gas\_price: real, mpg: real, resale\_value: real) returns (total\_cost: real)

### Ensures

- `total_cost == new_car_cost + (miles_per_year / mpg) * gas_price * 5.0 - resale_value`

### Requires

- `0.0 < mpg`

## GenAI interactions

Below you will find all interactions between the ‘user’ (program) and the ‘assistant’ (OpenAI).

### Program → GenAI

You are given the following task to perform in Dafny:

Write a method that helps a person decide whether to buy a hybrid car. Your methods's  
→ inputs should be: the cost of a new car, the estimated miles driven per year, the  
→ estimated gas price, the efficiency in miles per gallon, the estimated resale  
→ value after 5 years. Compute the total cost of owning the car for five years.

The signature should be:

```
method hybrid_car_cost(new_car_cost: real, miles_per_year: real, gas_price: real, mpg:  
→ real, resale_value: real) returns (total_cost: real)
```

The method should respect the following contract:

```
requires 0.0 < mpg, ensures total_cost == new_car_cost + (miles_per_year / mpg) *  
→ gas_price * 5.0 - resale_value
```

Produce and show only the Dafny body of this method, including the curly braces that  
→ surround it. Do not show the signature nor contract. You must not use 'assume'  
→ anywhere in your code.

### GenAI → Program

System fingerprint:

ID: chatcmpl-Co4Q8JUiOJmPGuWuoFWtM0tpxOQ7

Model: gpt-5.1-chat-latest

Created at: 1766049428

Finish reason: stop

Usage: 452 tokens in, and 113 tokens out

```
{  
    total_cost := new_car_cost + (miles_per_year / mpg) * gas_price * 5.0 - resale_value;  
}
```

## Final Program

```
method hybrid_car_cost(new_car_cost: real, miles_per_year: real, gas_price: real, mpg:  
→ real, resale_value: real) returns (total_cost: real)  
    requires 0.0 < mpg  
    ensures total_cost == new_car_cost + (miles_per_year / mpg) * gas_price * 5.0 -  
        → resale_value  
{  
    total_cost := new_car_cost + (miles_per_year / mpg) * gas_price * 5.0 - resale_value;  
}
```

## Total Token Usage

**Input tokens:** 452

**Output tokens:** 113

**Reasoning tokens:** 64

**Sum of ‘total tokens’:** 565

## Experiment Timings

**Overall Experiment** started at 1766049430066, ended at 1766049433441, lasting 3375ms (3.38 seconds)

**Iteration #1** started at 1766049430067, ended at 1766049433441, lasting 3374ms (3.37 seconds)