Group Problem - direct translation

This is the function that calculates the area of a trapezoid:

\[
\text{area-of-trapezoid}(\text{base}_1, \text{base}_2, \text{height}) = \frac{1}{2} \cdot (\text{base}_1 + \text{base}_2) \cdot \text{height}
\]

Translate this function into Racket. Provide the full design recipe.
Group Problem - pair?

Write a Racket function `pair?` which consumes 4 Nats. `pair?` produces `true` if any two of the consumed parameters are the same, and `false` otherwise. For this question, you may only use Boolean expressions (no `cond` allowed).

Include a full design recipe.
Group Problem - pokemon-battle

You’ve finally made it to the CS135 Gym and it is time to battle. Here are the rules:

- only 3 types are allowed: Fire, Water and Rock
- Water beats both Fire and Rock
- Rock beats Fire
- Any type can beat itself

Write a function `pokemon-battle` that consumes 2 Pokemon types and produces the winning type according to the rules above. Use the symbols 'fire, 'water and 'rock to represent the types. Include a design recipe.
Group Problem - loan-interest

The Bank of Amestris issues loans to its customers, which have either a 'standard or 'premium account. Their loan policies are as follows:

- If a customer has a bad credit history, the Bank refuses to give them a loan.
- Otherwise, if the duration of a loan is no more than 3 months, or the amount of money loaned is less than $500, no interest is paid on the loan.
- Otherwise, if a customer has a 'premium account, and the loan amount is no more than $25,000, interest is calculated based on the 'premium rate of 10%.
- Otherwise, interest is calculated on the 'standard rate of 15%.

Interest is calculated by multiplying the amount of the loan, the duration, and the interest rate together. You may assume that the amount and duration of a loan are both positive.
Group Problem - loan-interest

Write a function loan-interest, which consumes the amount and duration of the loan in months, a Boolean which is true if the customer has a bad credit history, and a symbol representing the account-type. The function will produce the amount of interest that the customer must pay on the loan, or $-1$ if the Bank refuses to give a loan.