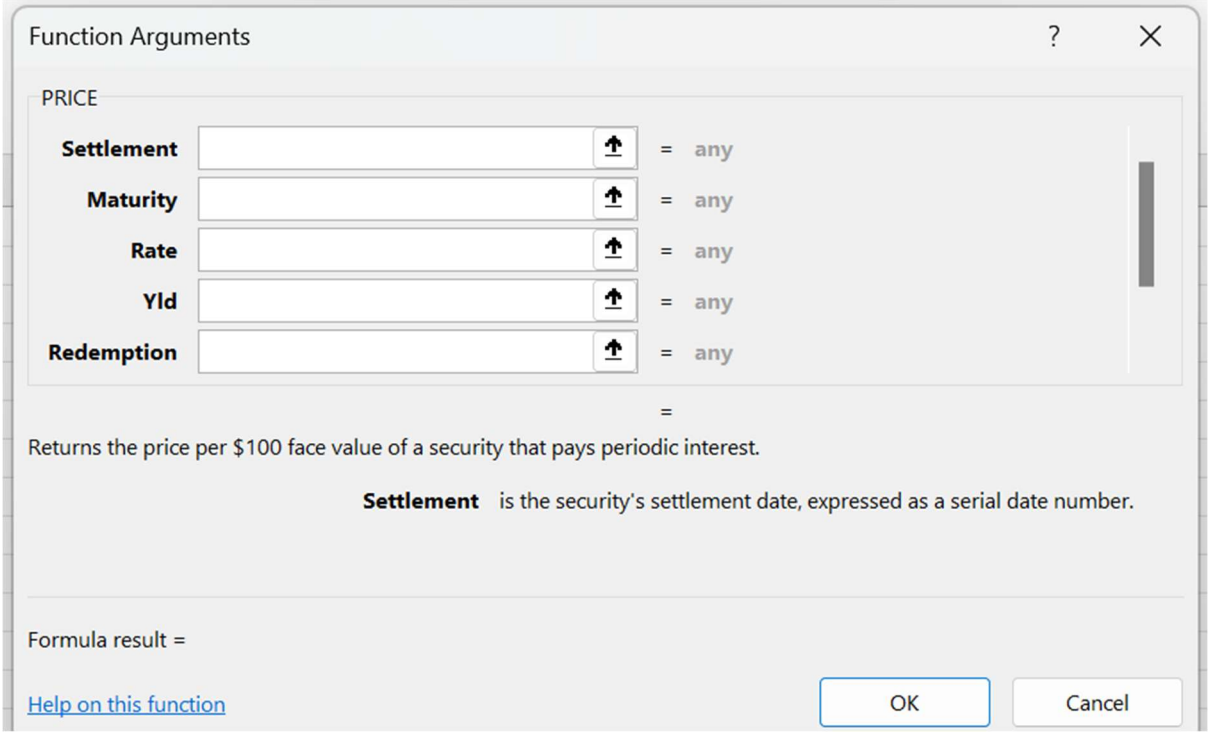
Bond Valuation Worksheet

List of Computations in the Worksheet

1. **Term**: Time to maturity (years).
2. **Duration**: Weighted average time to receive bond cash flows.
3. **Modified Duration**: Sensitivity of bond price to yield changes.
4. **Price**: Current market value of the bond.
5. **Coupon Rate**: Annual interest rate as a percentage of the face value.
6. **Face Value**: The principal amount to be repaid at maturity.



1. Intrinsic Value

- **Concept:** Intrinsic value is the theoretical value of a bond based on discounted future cash flows.

- **Excel Formula:**
  =PRICE(settlement, maturity, coupon_rate, yield, redemption, frequency, basis)/100*face_value
    - Arguments:
        - settlement: The bond's settlement date.
        - maturity: The bond's maturity date.
        - coupon_rate: Annual coupon rate.
        - yield: Required return.
        - redemption: Face value per 100.
        - frequency: Number of coupon payments per year.
        - basis: Day count basis (default 0 = 30/360).
- **Example:**
  For a bond with semi-annual payments, a settlement date, and maturity 10 years later, this formula calculates the bond's intrinsic value.

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2. Under/Over Valued

- **Concept:** Determines whether the bond is overvalued, undervalued, or fairly valued.
- **Excel Formula:**
  =IF(price>intrinsic_value, "Overvalued", IF(price<intrinsic_value, "Undervalued", "Fairly Valued"))
    - Arguments:
        - price: Market price of the bond.
        - intrinsic_value: Calculated theoretical value.
- **Example:**
  If the bond's market price is higher than its intrinsic value, it is "Overvalued."

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3. Accrued Interest

- **Concept:** Interest accrued from the last coupon payment date to the settlement date.
- **Excel Formula:**
  =YEARFRAC(COUPPCD(settlement, maturity, frequency, basis), settlement, basis)*coupon_rate*face_value/frequency

- Arguments:
  - COUPPCD: Finds the previous coupon payment date.
  - settlement: Settlement date.
  - maturity: Maturity date.
  - frequency: Number of coupon payments per year.
  - basis: Day count basis.
  - coupon_rate: Annual coupon rate.
  - face_value: Par value of the bond.

- **Example:**
  This formula calculates the accrued interest based on the bond's settlement and previous coupon dates.

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4. Current Yield

- **Concept:** Measures the bond's annual coupon income relative to its market price.
- **Excel Formula:**
  =coupon_rate*face_value/price
  - Arguments:
    - coupon_rate: Annual coupon rate.
    - face_value: Par value of the bond.
    - price: Current market price of the bond.
- **Example:**
  The formula divides annual coupon income by the bond's current market price.

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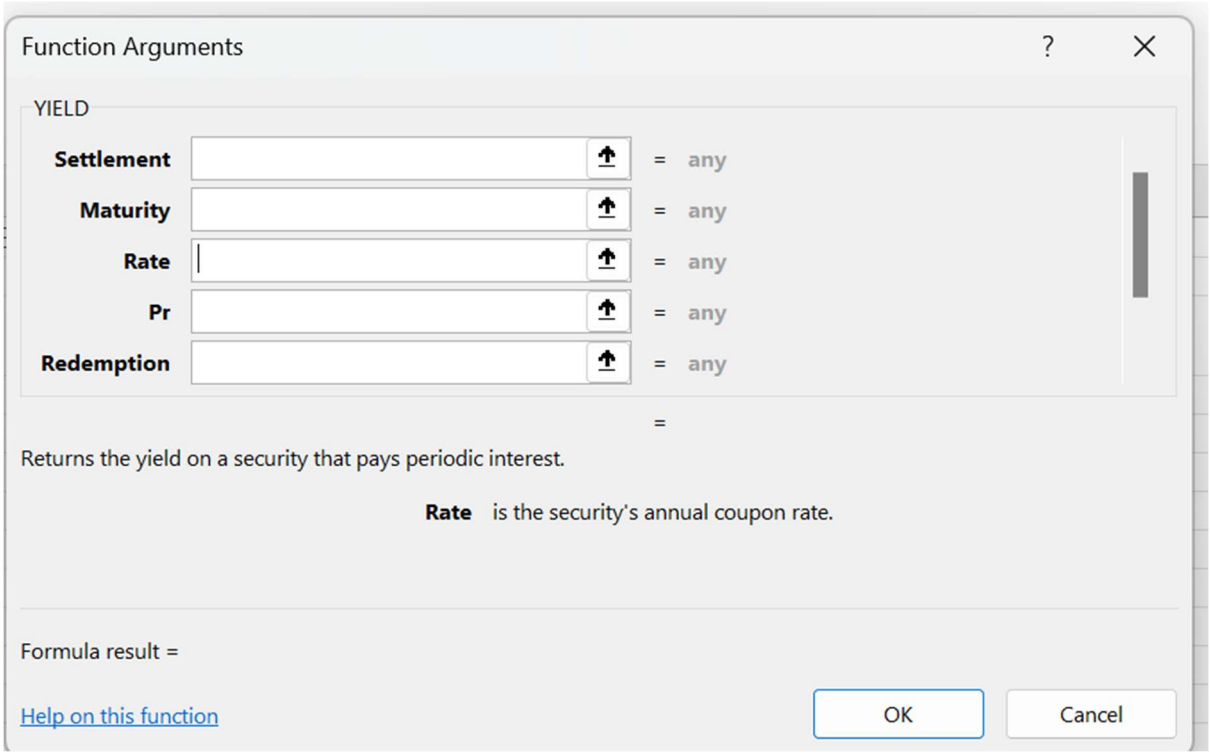
5. Yield to Maturity (YTM)

- **Concept:** YTM is the annualized rate of return on the bond if held to maturity.
- **Excel Formula:**
  =YIELD(settlement, maturity, coupon_rate, price, redemption, frequency, basis)
  - Arguments:
    - settlement: Settlement date.
    - maturity: Maturity date.

- coupon_rate: Annual coupon rate.
- price: Market price of the bond.
- redemption: Face value per 100.
- frequency: Number of coupon payments per year.
- basis: Day count basis.



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6. Duration

- **Concept:** Measures the bond's price sensitivity to changes in interest rates.
- **Excel Formula:**
  =DURATION(settlement, maturity, coupon_rate, yield, frequency, basis)
  - Arguments:
    - settlement: Settlement date.
    - maturity: Maturity date.
    - coupon_rate: Annual coupon rate.
    - yield: Required return.
    - frequency: Number of coupon payments per year.
    - basis: Day count basis.

- **Example:**
  Duration reflects the weighted average time to receive cash flows.

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7. Modified Duration

- **Concept:** Adjusts the duration to reflect price sensitivity to yield changes.
- **Excel Formula:**
  =MDURATION(settlement, maturity, coupon_rate, yield, frequency, basis)
    - Arguments:
        - settlement: Settlement date.
        - maturity: Maturity date.
        - coupon_rate: Annual coupon rate.
        - yield: Required return.
        - frequency: Number of coupon payments per year.
        - basis: Day count basis.
- **Example:**
  Modified Duration is calculated as Duration divided by (1 + YTM/frequency).

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8. Price Sensitivity to Yield Changes

- **Concept:** Measures the percentage change in price due to changes in yield.
- **Excel Formula:**
  =(PRICE(settlement, maturity, coupon_rate, yield+change_in_yield, redemption, frequency, basis)/price-1)*100
    - Arguments:
        - settlement: Settlement date.
        - maturity: Maturity date.
        - coupon_rate: Annual coupon rate.
        - yield: Current yield.
        - change_in_yield: Change in yield (e.g., +0.02 or -0.02).
        - redemption: Face value per 100.
        - frequency: Number of coupon payments per year.

- basis: Day count basis.
- price: Current market price of the bond.

- **Example:**
  For a yield increase of 2%, this formula calculates the percentage price change.