1. Paper: "Chain-of-Thought Prompting Elicits Reasoning" (file: 2201.11903v6.pdf)

* Chain-of-Thought Prompting: In sentiment analysis, chain-of-thought (CoT) prompting involves guiding the model to explain its reasoning as it processes a review, enhancing accuracy. For customer reviews, this approach can prompt the model to generate a rationale (e.g., "The review is positive because...") before concluding with the sentiment classification.
* Example Instruction: "To elicit reasoning for sentiment analysis, we prompt the model with a series of example reviews and annotations such as 'positive because the product met expectations' or 'negative due to delayed shipping.' This enables the model to mimic reasoning and infer sentiment more transparently"​.

2. Paper: "Zero-shot Learning with GPT Models" (file: 2301.03412v2.pdf)

* Zero-Shot Sentiment Analysis: This paper outlines how GPT models perform sentiment analysis without additional fine-tuning. By providing the model with a natural language description of the task (e.g., "Classify this review as positive or negative"), GPT can infer sentiment directly from the provided review text without any prior examples.
* Example Instruction: "For customer review sentiment analysis, prompt the model with a task description like 'This is a review about [product]. Determine if the sentiment is positive, neutral, or negative' followed by the review text. The model uses its pre-trained understanding to make predictions in zero-shot settings"​.

3. Paper: "Applications in Sentiment Analysis and Beyond" (file: 2204.02311v5.pdf)

* Few-Shot Learning for Sentiment: This paper describes using few-shot learning to improve GPT's accuracy in sentiment analysis. A small number of labeled examples are provided to the model, after which it generalizes sentiment predictions across new, unseen reviews.
* Example Instruction: "Provide the model with a few annotated customer reviews (e.g., 'This product is great! => Positive') and then prompt it to analyze a batch of new reviews, applying the learned sentiment classifications"​.

You are tasked with performing sentiment analysis on a CSV file containing customer reviews. Follow these instructions carefully to analyze the reviews, provide reasoning, and assign a sentiment score for each entry.

**Instructions:**

1. **Input:**
   * You will receive a CSV file with the following columns: name, price, description, sustainability\_features, rating\_x, number\_of\_reviews, product\_page\_url, product\_id, url, rating\_y, author, date, and content.
   * The relevant column for this task is the content column, which contains customer reviews. You will focus on analyzing the text within this column to determine the sentiment conveyed in each review.
2. **Task:**
   * For each row in the CSV, perform the following steps:
     + **Analyze the review text** in the content column to identify the sentiment expressed by the customer.
     + Use **few-shot learning** to guide your understanding. Consider the following examples of customer reviews:
       - "The product is amazing, I love it!" => Positive
       - "The product was broken when it arrived, very disappointed." => Negative
       - "It’s a decent product, but nothing special." => Neutral
     + After reviewing these examples, apply **chain-of-thought reasoning** to break down the sentiment of each review step-by-step. For example, if a review states "The product is good, but the shipping was slow," consider both the positive and negative elements before arriving at an overall sentiment score. The reasoning should reflect how you balanced different aspects of the review to determine its sentiment.
3. **Sentiment Score:**
   * Assign a sentiment score to each review on a discrete scale from -2 to 2, based on the overall sentiment expressed:
     + -2: Most negative sentiment
     + -1: Slightly negative sentiment
     + 0: Neutral sentiment
     + 1: Slightly positive sentiment
     + 2: Most positive sentiment
   * The sentiment score should reflect the combined result of your analysis, with the reasoning behind it clearly understood.
4. **Output:**
   * After completing the sentiment analysis for each review, update the CSV file with **two new columns**:
     + - **sentiment\_score**: This column will contain the sentiment score you assigned to each review.
       - **cot\_reasoning**: This column will include your step-by-step reasoning (chain-of-thought) that explains how you arrived at the sentiment score.

**Example of Processing a Review:**

* **Input Review:** "The product is great, but it arrived late."
* **Chain-of-Thought Reasoning (CoT):**
  + **Step 1:** The customer is happy with the product quality, which suggests a positive sentiment.
  + **Step 2:** However, the late arrival introduces a negative aspect, indicating some dissatisfaction.
  + **Step 3:** Overall, the positive aspect (the product being great) outweighs the negative aspect (late arrival), so the review leans slightly positive.
* **Sentiment Score:** 1
* **CoT Reasoning:** "The customer is happy with the product quality, but mentioned a delay in arrival. Despite this, the emphasis on the product’s quality indicates a slightly positive sentiment."

Proceed with this methodology for each row in the CSV, ensuring each review is analyzed thoroughly, and both the sentiment score and chain-of-thought reasoning are provided.