## Instructions

Complete the following exercises based on the transformations of linear functions. Show your work where necessary and answer each question in the space provided.

### 1. Identify the Transformation

For each of the following functions, identify what type of transformation (shifting up, down, left, right, reflection, or stretching/compressing) occurred compared to the base function $f(x) = x$.

- a. $g(x) = x + 3$
  Transformation: _____
- b. $h(x) = -2x$
  Transformation: _____
- c. $j(x) = x - 5$
  Transformation: _____
- d. $k(x) = (1/2)x$
  Transformation: _____

### 2. Graph the Transformations

Graph the following transformations of $f(x) = x$ on the coordinate plane. Use a separate sheet of paper if necessary and label each graph.

- a. $g(x) = x + 4$
- b. $h(x) = -x$
- c. $j(x) = 3x - 2$

### 3. Write the Equation of the Transformed Function

Based on the transformations described below, write the corresponding equation of the linear function.

- a. The function $f(x) = x$ is reflected over the x-axis and then shifted up by 6 units.
  Equation: _____
- b. The function $f(x) = x$ is stretched vertically by a factor of 4 and shifted left by 2 units.
  Equation: _____

### 4. Word Problem

A taxi company charges a flat fee of $3 when you enter the taxi, and then $2 for each mile driven. Write the linear function that represents the cost (C) based on the number of miles (m) driven. Now, if the taxi company decides to increase the flat fee to $5 while keeping the per-mile charge the same, write the new function.

Original function: C(m) = _____

New function: C(m) = _____

### 5. Reflection and Translation

The function $f(x) = x$ is translated 3 units to the right and reflected over the x-axis. Write the function representing this transformation.

Transformed function: _____

**Bonus Challenge**

Consider the function $f(x) = 2x + 1$. If this function is translated down by 4 units and stretched vertically by a factor of 3, what will be the new function?
New function: _____