AFM **4.3 Lines in Motion** Chapter 4

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| **Translation:** A movement of a graph vertically, horizontally, or both. |
| y = f(x – h) + kA translation of the graph y = f(X) horizontally h units and vertically k units. |
| * If h is positive, then shift right
 | * If k is positive, then shift up
 |
| * If h is negative, then shift left
 | * If k is negative, then shift down
 |

**Image:** In a translation, every point (x1, y1) is mapped to a new point (x + h, y + k). This new point is called the image of the original point.

**Example 1:** Describe how the graph f(x) = 2(x – 3) + 4 is a translation of the graph f(x) = 2x. What is the image of the origin (0, 0)?

**Example 2:** The graph of the line f(x) = -2x is translated right 5 units and down 3 units. What is the equation of the new line?

**Example 3:** If f(x) = 2x + 1, find:

1. f(x + 3)
2. f(x – 2) – 3
3. f(x + 1) + 5

**Example 4:** Consider the line that passes through points (2, 5) and (-3, 2).

1. Find the equation of the line.
2. Write an equation of the parallel line that is 2 units above this line.

**Example 5:** Write an equation of each line.

1. The line y = 5x translated up 2 units
2. The line y = 3x translated left 3 units
3. The line y = x translated down 2 units and right 1 unit