

Sample

November 22, 2025

1 Preamble / Introduction

The point $(1, -2)$ is on the graph of f . Describe the following transformations on f , and determine the resulting point. We use $g(x) = a f k(x - d) + c$, $x' = x k + d$, $y' = a y + c$.

- a) $g(x) = 2f(x) + 3$
The $a = 2$ indicates a vertical stretch by a factor of 2 and the $c = 3$ indicates a vertical translation of 3 units up. $x' = x k + d = 1 \cdot 1 + 0 = 1$ $y' = a y + c = 2(-2) + 3 = -1$ Therefore, the resulting point is $(1, -1)$.
- b) $g(x) = f(x + 1) - 3$
The $d = -1$ (since $x - d = x - (-1) = x + 1$) indicates a horizontal translation of 1 unit to the left and the $c = -3$ indicates a vertical translation of 3 units down. $x' = x k + d = 1 \cdot 1 + (-1) = 0$ $y' = a y + c = 1(-2) + (-3) = -5$ Therefore, the resulting point is $(0, -5)$.
- c) $g(x) = -f(2x)$
The $a = -1$ indicates a reflection in the x -axis and the $k = 2$ indicates a horizontal compression by a factor of $1/2$. $x' = x k + d = 1 \cdot 2 + 0 = 1$ $y' = a y + c = (-1)(-2) + 0 = 2$ $2, 2$. Therefore, the resulting point is $(1, 2)$.
- d) $g(x) = -f(-x - 1) + 3$
The $a = -1$ indicates a reflection in the x -axis, the $k = -1$ indicates a reflection in the y -axis, the $d = -1$ (from $x - d = x - (-1) = x + 1$) indicates a horizontal translation of 1 unit to the left, and the $c = 3$ indicates a vertical translation of 3 units up. $x' = x k + d = 1 \cdot -1 + (-1) = -2$ $y' = a y + c = (-1)(-2) + 3 = 5$ Therefore, the resulting point is $(-2, 5)$.
- e) The point $(1, -2)$ is on the graph of f . Describe the following transformations on f , and determine the resulting point. We use $g(x) = a f k(x - d) + c$, $x' = x k + d$, $y' = a y + c$.
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