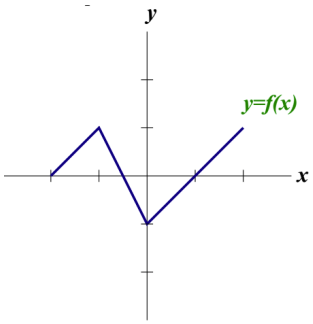
Practice Problems for Math Success

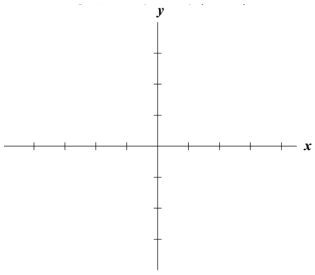
Transformation of Functions

These **practice problems** are designed to help you **prepare for our course exams** and **assess your understanding** of the course material at the expected level. Aim to complete them **in class, during tutoring, office hours, or on your own**, and try to solve them **without notes or a calculator**, just like on the **actual exams**. Remember, **practice makes perfect**, so don't hesitate to **ask for help** if you get stuck.

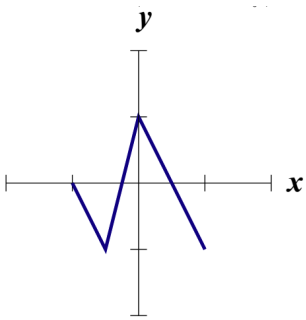
1. The graph of $y = f(x)$ is drawn below. In each graph, a tickmark represents the same unit.



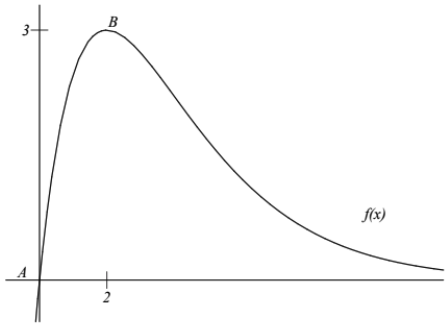
(a) Draw the graph of $y = -f(x+2) + 1$.



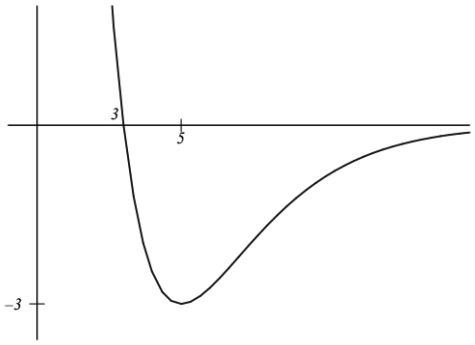
(b) Find a formula, in terms of f, for the following transformation of the graph of f.



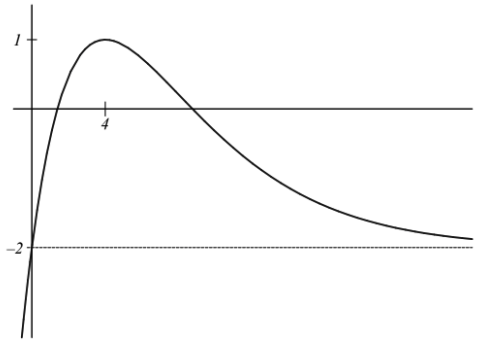
2. The graph of f is drawn below.



(a) Find a formula, in terms of f, for the following transformation of the graph of f.



(b) Find a formula, in terms of f, for the following transformation of the graph of f.



3. Let $y = f(x)$ be a function with domain $D = [-2, 6]$ and range $R = [-4, 8]$, and also let $f(-2) = 8$ and $f(6) = -4$. Find the domain and the range of each of the following functions.

   (a) $y = f(x + 2) - 3$

   Domain = _____ Range = _____.

   (b) $y = -f(x)$

   Domain = _____ Range = _____.

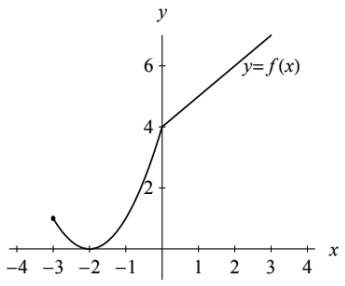
   (c) $y = f(0.5x)$

   Domain = _____ Range = _____.

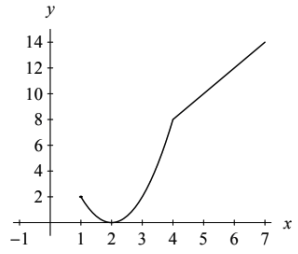
   (d) $y = f(-x)$

   Domain = _____ Range = _____.

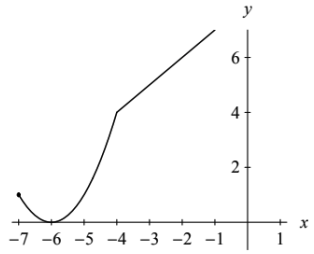
4. The graph of $y = f(x)$ is drawn below.



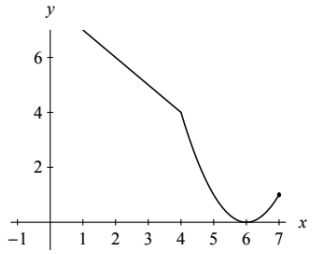
(I)



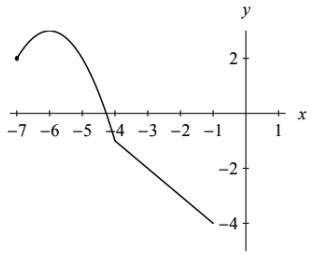
(II)



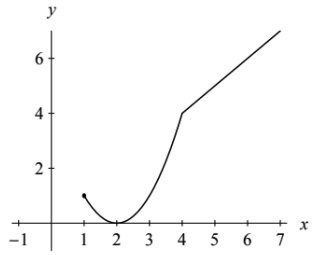
(III)



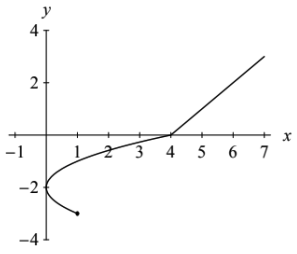
(IV)



(V)



(VI)



Match each formula with a graph from I-VI, or write NONE if none of these graphs represents the given formula.

(a) The graph of $y = f(x + 4)$ is _____.

(b) The graph of $y = 3 - f(x + 4)$ is _____.

(c) The graph of $y = f(-x + 4)$ is _____.

(d) The graph of $y = 2f(x - 4)$ is _____.

(e) The graph of $y = f^{-1}(x)$ is _____.