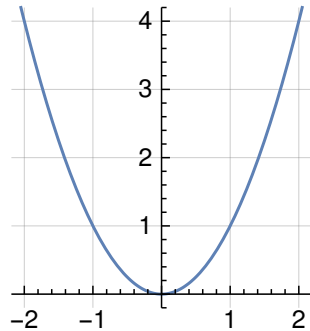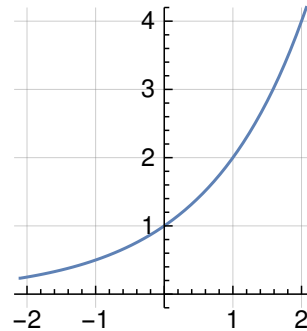1. Let $f(x) = x^2$ and $g(x) = 2^x$, whose graphs are given below.
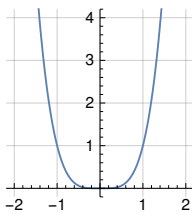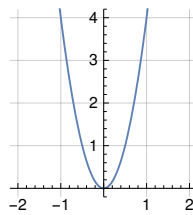

$$f(x) = x^2 \qquad\qquad g(x) = 2^x$$

(a) Identify each of the following graphs with the functions below them.
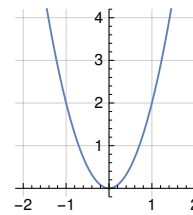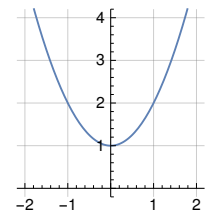
$$f(x+1) \qquad f(x)+1 \qquad 2f(x) \qquad f(2x) \qquad f(x)^2$$
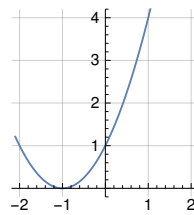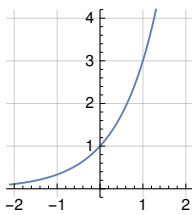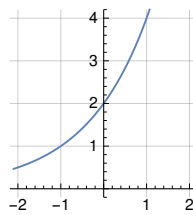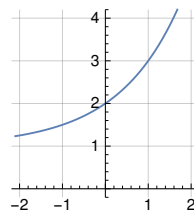
(b) Identify each of the following graphs with the functions below them.
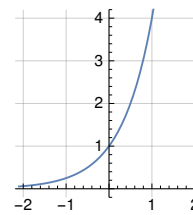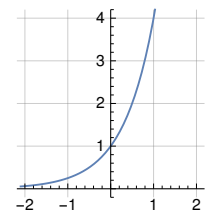
$$g(x+1) \qquad g(x)+1 \qquad 2g(x) \qquad g(2x) \qquad g(x)^2$$
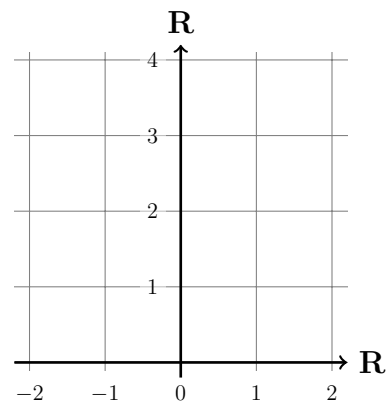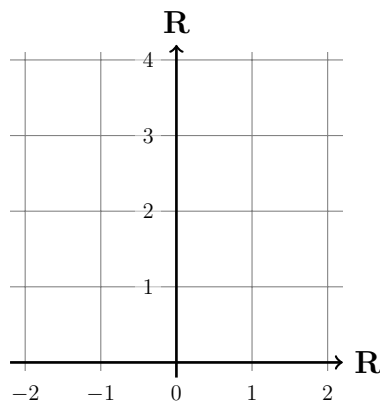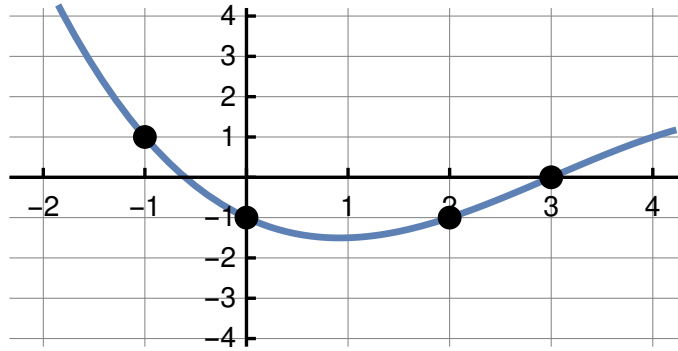
(c) Draw $f(x+1)^2 + 1$ on the left, and $g(x+1)^2 + 1$ on the right.

2. Consider the function $f(x)$, whose graph is given below. Note the points in goes through.

This question is about the functions $af(bx + c) + d$, for some numbers $a, b, c, d \in \mathbf{R}$.

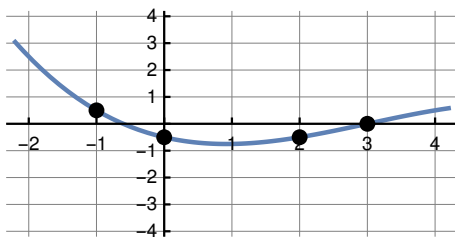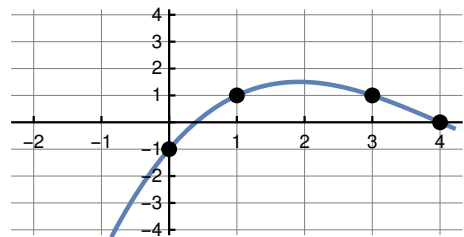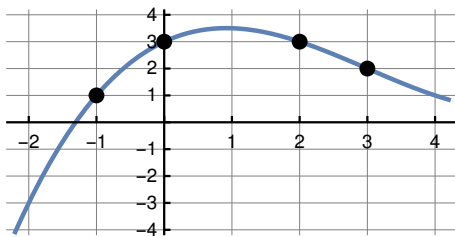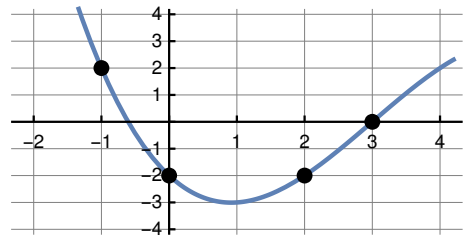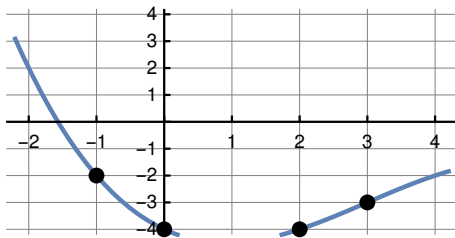(a) What values of a, b, c, d give the original function $f(x)$?

(b) Identify the values a, b, c, d for each function below that give the corresponding graph. The marked points above are also marked in each plot.
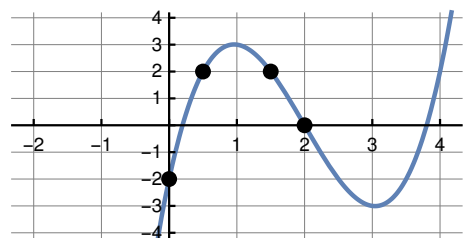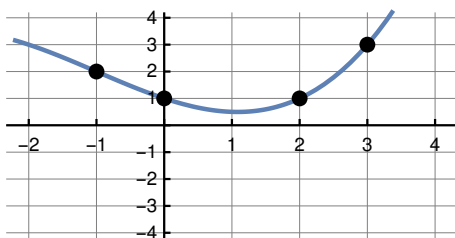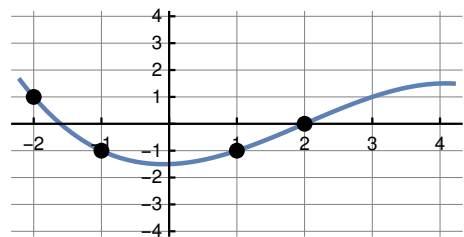
(c) **Bonus:** If the point (p, q) lies on the graph of $f(x)$, what are the coordinates of this point on the graph of $af(bx + c) + d$?