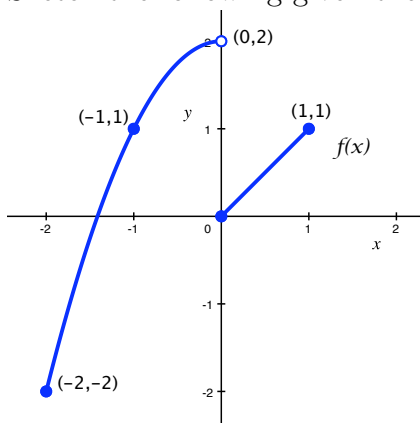


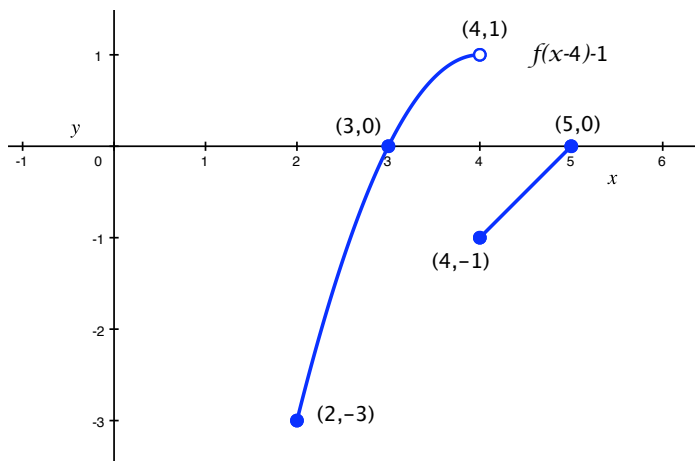
Math 111 Worksheet #12

November 16, 2007

1. Sketch the following given the graph of $f(x)$ below.

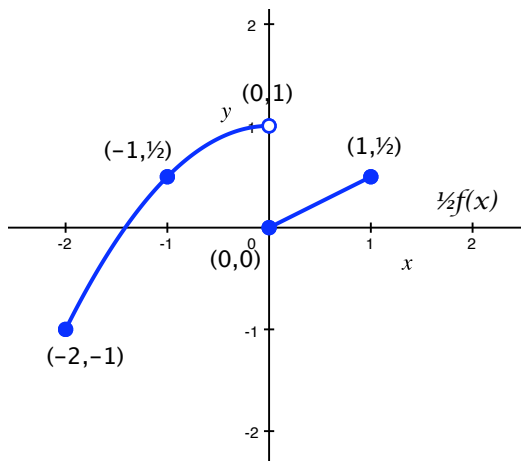


(a) $f(x - 4) - 1$



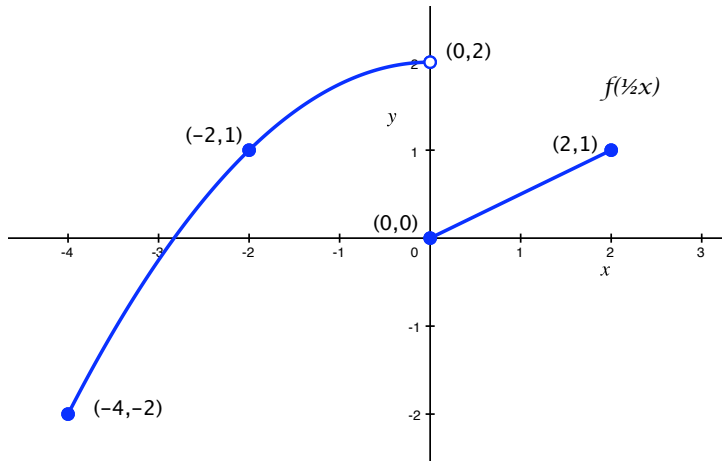
Shift $f(x)$ to the right by 4 and down by 1.

(b) $\frac{1}{2}f(x)$



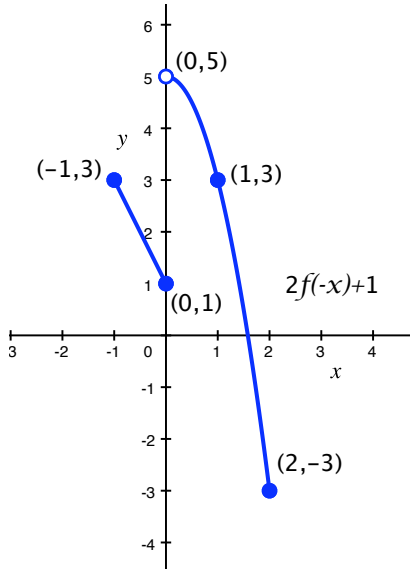
Vertically compress $f(x)$ by a factor of $\frac{1}{2}$.

(c) $f(\frac{1}{2}x)$



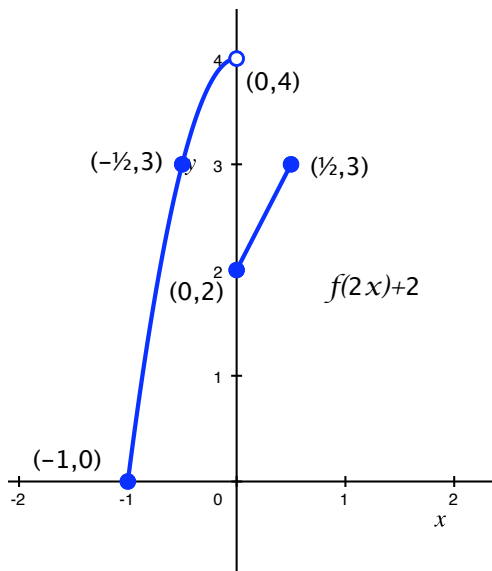
Horizontally stretch $f(x)$ by a factor of 2.

(d) $2f(-x) + 1$



Reflect $f(x)$ over the y -axis, vertically stretch by a factor of 2, and then shift $f(x)$ up by 1.

(e) $f(2x) + 2$



Horizontally compress $f(x)$ by a factor of $\frac{1}{2}$ and shift by 2.

2. Is the function $f(x)$ shown above odd, even, or neither?

The function $f(x)$ is neither. It is not even because it is not symmetric about the y -axis and it is not odd because it is not symmetric about the origin (not the same if rotated 180°).

3. Is the function $g(x) = 12x^5 - x^3$ odd, even, or neither?

$$\begin{aligned} \text{Consider } g(-x) &= 12(-x)^5 - (-x)^3 = 12(-x^5) - (-x^3) \\ &= -12x^5 + x^3 \\ &= -(12x^5 - x^3) \\ &= -g(x) \end{aligned}$$

Since $g(-x) = -g(x)$, $g(x)$ is an odd function.