Math 1513 - College Algebra

Quiz #12 - 2018.10.05

Solutions

Sketch the graph of $F(x) = -2(x+1)^2 - 3$ by starting with the parabola $f(x) = x^2$ and performing translations, scalings and/or reflections to obtain the graph of $F(x)$. Show and explain your steps!

We start with the graph of $f(x) = x^2$ (blue-dashed) and shift it to the right 1 unit to end up with $g(x) = f(x+1) = (x+1)^2$ (red-dashed). Next, we scale by a factor of 2, which stretches vertically, i.e. $h(x) = 2g(x) = 2(x+1)^2$ (green-dashed). Then we reflect across the x-axis by $i(x) = -h(x) = -2(x+1)^2$ (magenta-dashed). Finally, we translate the graph down 3 units, i.e. $j(x) = i(x) - 3 = -2(x+1)^2 - 3 = F(x)$. This is the cyan-solid parabola opening downward with vertex at $(-1, -3)$.

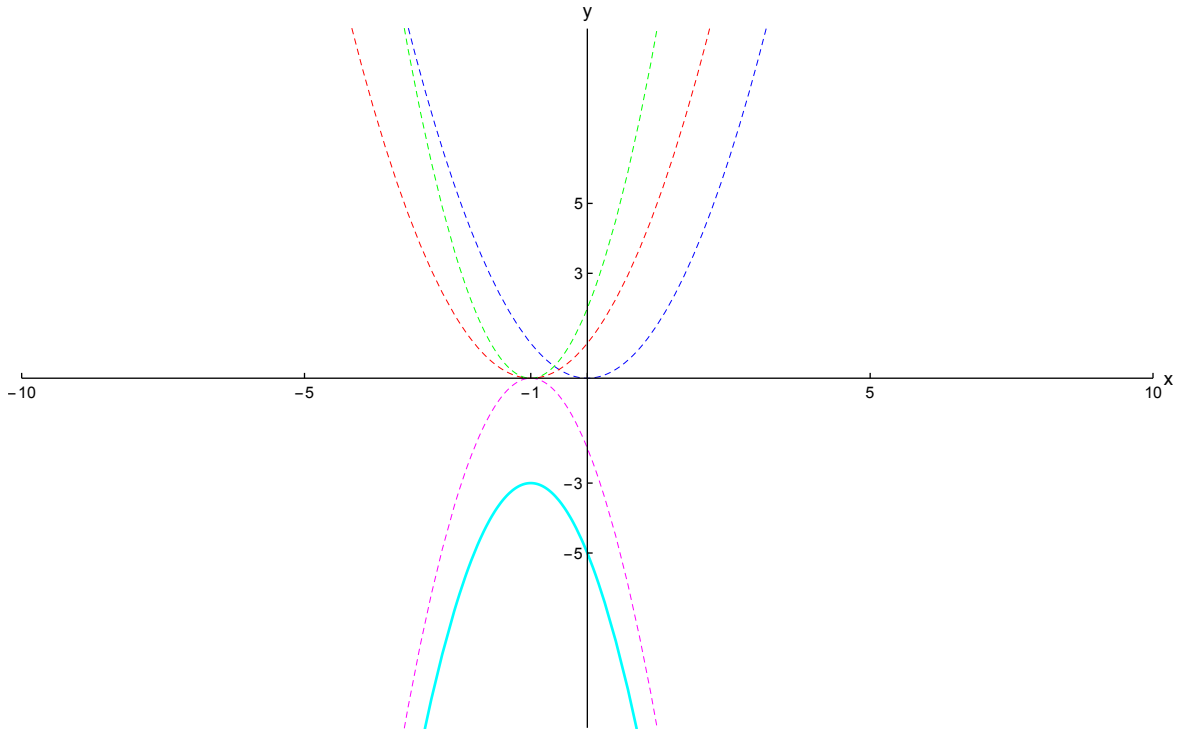

FIGURE 1. Graph of $F(x) = -2(x+1)^2 - 3$ (cyan) along with intermediate graphs starting with $f(x) = x^2$ (blue-dashed).