Graphing Quadratics.

Idea: complete the square to turn quadratic polynomial $g(x) = 2x^2 - 4x + 3$ into a the form $g(x) = A(x-h)^2 + k$.

Then, realize that the graph of $g(x)$ is related to graph of $f(x) = x^2$ by

- Vertical scaling by $\cdot A$
- Horizontal shift by h
- vertical shift by k

$$
\begin{aligned}
g(x) &= 2x^2 - 4x + 3 \\
&= 2(x^2 - 2x) + 3 \\
&= 2(x^2 - 2x + 1 - 1) + 3 \\
&= 2(x^2 - 2x + 1) - 2 + 3 \\
&= 2(x-1)^2 + 1 \\
&= A(x-h)^2 + k
\end{aligned}
$$

where $A = 2$, $h = 1$, $k = 1$