1. Consider the grid of lines $z = n + it$ and $z = s + im$.

Find the image of this grid in the $w$ plane for each of the following:

a) $w = 2z + i(1 - z)$. 

![Diagram showing the transformation of the grid lines under the mapping $w = 2z + i(1 - z)$]
b) $w = z^2$. 
c) \( w = z^2 + iz \)
d) \( w = e^z \).
e) $w = \cos(z)$. 
2. Consider the polar grid \( z = ne^{i\theta} \) and \( z = te^{ik\pi/12} \).

Find the image of this grid in the \( w \) plane for each of the following:

a) \( w = 2z + i(1 - z) \).
b) \( w = z^2 \).
c) $w = z^3$
d) $w = e^z$. 
e) \( w = \cos(z) \).
3. For $w = 3z^2 - 2z^3$, sketch in the $z$ plane all the curves which map to the real and imaginary axes in the $w$ plane. Label each resulting region in the $z$ plane according to which quadrant in the $w$ plane it maps to.

Finally, give your best guess as to the net of curves which map to horizontal and vertical lines in the $w$ plane.