1. Match each function with its contour plot below.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
</tbody>
</table>

**Solution:**
To solve this problem, we need to give \( z \) different values and find the curve corresponding to function of \( x \) and \( y \).

(a) \( z = \sqrt{y^2 - x^2} \)
Here we first let \( z \) to be 0, in this way we have \( x = y \) and \( x = -y \). Then we let \( z \) equal to 1, the function becomes \( y^2 - x^2 = 1 \), which is a hyperboloid. So we should choose \( G \) as our answer. Similarly, we have:

(b) The graphic for \( z = 5ye^x \) is \( E \).
(c) The graphic for \( z = x^3 - 3y \) is \( B \).
(d) The graphic for \( z = \ln(5x^2 + 4y^2) \) is \( D \).
(e) The graphic for \( z = \sqrt{2x} + y \) is \( C \).
(f) The graphic for \( \frac{3y}{x^2 + y^2} \) is \( H \).