

NAME(S):  
MATH 259

$$f(x, y) = e^x \cos y$$

MARCH 7, 2014

1. Sketch the curves of intersection of  $z = e^x \cos y$  with the planes  $x = -1$ ,  $x = 0$ , and  $x = 1$ .



2. Sketch the curves of intersection of  $z = e^x \cos y$  with the planes  $y = 0$ ,  $y = \frac{\pi}{6}$ , and  $y = \frac{\pi}{2}$ .



3. The curve of intersection of  $z = e^x \cos y$  with the plane  $x = 1$  has tangent line  $\mathbf{r}(t) = \langle 1, t, e \rangle$  at the point  $(1, 0, e)$ . Find an equation for the tangent line to the curve of intersection of  $z = e^x \cos y$  with the plane  $y = 0$  at the point  $(1, 0, e)$ .

4. The two tangent lines you found in the previous problem determine a plane called the *tangent plane* to the surface  $z = e^x \cos y$ . Find an equation for this plane.