1. Along the x-axis (where y = 0), \( F(x, y) = \frac{x^2}{y^2} = 1 \)
   except at the origin, where \( F(x, y) \) is undefined.
   So the limit as we approach the origin horizontally is +1.

   Similarly, along the y-axis (where x = 0),
   \[ F(x, y) = \frac{-y^2}{y^2} = -1 \]
   and the limit as we approach the origin vertically is -1.
   Since limits, if they exist, must be unique, the limit as we approach the origin does not exist.

   **Remark:** \( F(0,0) \) undefined does not mean the limit does not exist. It does mean \( F(x, y) \) is not continuous there.

2. a) If \( (y-1,-2, zt+3) = \lambda (2, -1, 3) \), looking at the y-components tells us \( \lambda = \frac{1}{3} \).
   Then solving the equations \( (y-1)=\frac{1}{3} (z) \) and \( zt+3=\frac{1}{3} (8) \),
   we see that \( t = \frac{1}{6} \) solves both of them,
   so the vectors are parallel exactly when \( t = \frac{1}{6} \).

   b) \[ \begin{vmatrix}
   \hat{i} & \hat{j} & \hat{k} \\
   0 & 1 & 1 \\
   1 & 0 & 1 \\
   \end{vmatrix} = \begin{vmatrix}
   \hat{i} & \hat{j} & \hat{k} \\
   0 & -1 & 1 \\
   1 & 0 & 1 \\
   \end{vmatrix} = \begin{vmatrix}
   \hat{i} & \hat{j} \\
   1 & 0 \\
   \end{vmatrix} = \begin{vmatrix}
   \hat{i} & \hat{j} \\
   0 & 1 \\
   \end{vmatrix} = -\hat{i} + \hat{j} - \hat{k} \]
   or \((-1, 1, -1)\).

3. \( f_x = -2x - 3y \)
   \[ \begin{bmatrix}
   f_{xx} & f_{xy} \\
   f_{yx} & f_{yy} \\
   \end{bmatrix} = \begin{bmatrix}
   -2 & -5 \\
   -5 & -8 \\
   \end{bmatrix} \]
   Since the determinant \( D \) of this matrix is \((-2)(-8) - (-5)^2 < 0\),
   we have a saddle point at the origin.
First look for critical points:
\[ F_x = y = 0 \] so \((0,0)\) is a critical point with \(F(0,0) = 0, \)
\(F_y = x = 0 \) (Since it is on the boundary, we'll have to further consider the point \((0,0)\) anyway.)

Second, look at the vertices:
\[ F(0,0) = F(0,1) = F(2,0) = 0 \]

Third, look at each of the three edges using 1-var calculus or LM
(horizontal edge: \((x,0)\) \(0 < x < 2\) \(F(x,0) = 0\) (all points are potential max/min)
vertical edge: \((0,y)\) \(0 < y < 1\) \(F(0,y) = 0\)
slant edge: \(x = 2 - 2y \) \(0 < y < 1\)
\[ F(2 - 2y, y) = 2y - 2y^2 = g(y) \]
1-var calculus on \(g(y)\) gives \(g'(y) = 2 - 2y = 0\)
\(y = \frac{1}{2} \Rightarrow x = 2 - 2\left(\frac{1}{2}\right) = 2 - 1 = 1\)

So \((1, \frac{1}{2})\) is also a possible max/min
\[ F(1, \frac{1}{2}) = \frac{1}{2} \]

Comparing values we see that the global max is \(\frac{1}{2}\) at \((1, \frac{1}{2})\) and the global min is 0 attained at all points on the two legs of the right triangle.