If T is linear Transformation from $R^2 \to R^2$
then reflection across line $y = mx$
given by

$$T(a,b) = \left(2\,\frac{(a+mb)}{1+m^2} - a \;,\; 2\left(\frac{m(a+mb)}{1+m^2}\right) - b \right)$$

then just find $T(e_1)$ & $T(e_2)$
where $e_1 = (1,0)$ & $e_2 = (0,1)$
then you will get your answer.

$$T(a,b) = \left(2\left(\frac{a+mb}{1+m^2}\right) - a \;,\; 2\left(\frac{m(a+mb)}{1+m^2}\right) - b \right)$$

$$T(1,0) = \left(2\left(\frac{1+m\cdot 0}{1+m^2}\right) - 1 \;,\; 2\left(\frac{m(1+m\cdot 0)}{1+m^2}\right) - 0 \right)$$

$$= \left(\frac{2}{1+m^2} - 1 \;,\; \frac{2m}{1+m^2} \right)$$

$$= \left(\frac{2-(1+m^2)}{1+m^2} \;,\; \frac{2m}{1+m^2} \right) = \boxed{\left(\frac{1-m^2}{1+m^2} \;,\; \frac{2m}{1+m^2} \right)}$$

$$T(0,1) = \left(2\left(\frac{0+m\cdot 1}{1+m^2}\right) - 0 \;,\; 2\left(\frac{m(0+m\cdot 1)}{1+m^2}\right) - 1 \right)$$

$$= \left(\frac{2m}{1+m^2} \;,\; \frac{2m^2}{1+m^2} - 1 \right) \Rightarrow \left(\frac{2m}{1+m^2} \;,\; \frac{2m^2-(1+m^2)}{1+m^2} \right)$$

$$\left(2m \;,\; m^2 - 1 \right)$$

$$= \left(\frac{2}{1+m^2} - 1 , \frac{2m}{1+m^2} \right)$$

$$= \left(\frac{2-(1+m^2)}{1+m^2} , \frac{2m}{1+m^2} \right) = \boxed{\left(\frac{1-m^2}{1+m^2} , \frac{2m}{1+m^2} \right)}$$

$$T(0,1) = \left(2\left(\frac{0+m\cdot 1}{1+m^2} \right) - 0 , 2\left(\frac{m(0+m\cdot 1)}{1+m^2} \right) - 1 \right)$$

$$= \left(\frac{2m}{1+m^2} , \frac{2m^2}{1+m^2} - 1 \right) \Rightarrow \left(\frac{2m}{1+m^2} , \frac{2m^2-(1+m^2)}{1+m^2} \right)$$

$$= \boxed{\left(\frac{2m}{1+m^2} , \frac{m^2-1}{1+m^2} \right)}$$

Thus $[T]_\beta = \begin{bmatrix} \frac{1-m^2}{1+m^2} & \frac{2m}{1+m^2} \\ \frac{2m}{1+m^2} & \frac{m^2-1}{1+m^2} \end{bmatrix} = \boxed{\frac{1}{m^2+1} \begin{bmatrix} 1-m^2 & 2m \\ 2m & m^2-1 \end{bmatrix}}$