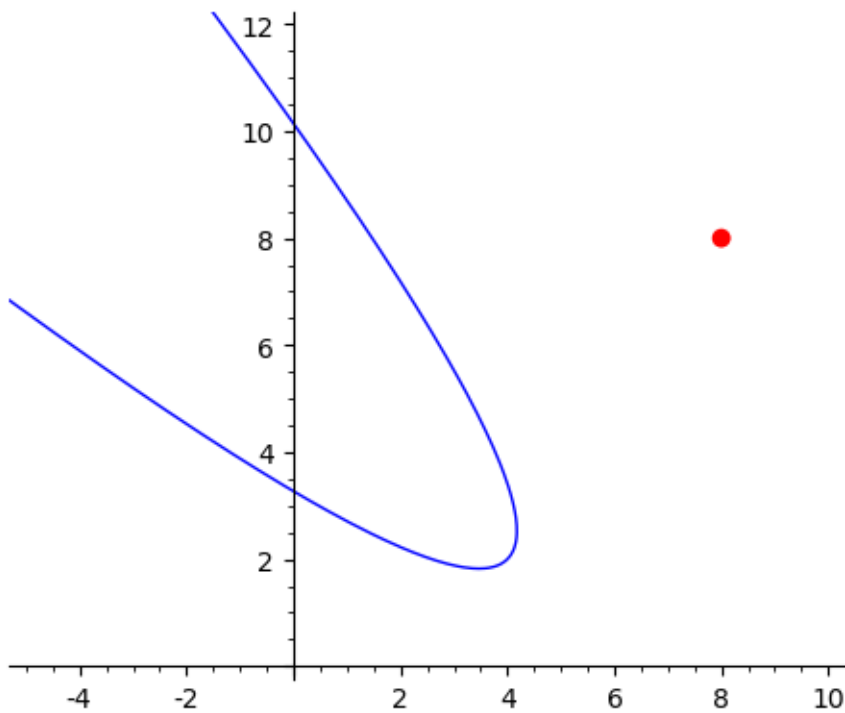**The Hong Kong Polytechnic University**
Department of Applied Mathematics
AMA1007 / AMA1120 (Calculus and Linear Algebra)
Assignment 1-A

This is a CoCalc exercise. Consider a titled parabola in parametric form and an external point as shown below:

```
[1]: ptx=8
     pty=8
     c1=4
     c2=2
     r1=1
     r2=1
     alpha=pi/4
     x(t)=r1*cos(alpha)*t-r2*sin(alpha)*t^2+c1
     y(t)=r1*sin(alpha)*t+r2*cos(alpha)*t^2+c2
     p1=parametric_plot( (x(t), y(t)), (t, -4, 4) )
     p2=point((ptx,pty), rgbcolor='red', pointsize=50)
     (p1+p2).show(xmin=-5,xmax=10,ymin=0,ymax=12)
```


At the location on the parabola closest to the external point, plot the tangent line and the normal line.