No books, notes or graphing calcuators. Turn off your cell phones. SHOW ALL YOUR WORK.

(5)   1.   Find an equation of the tangent line to the curve $x^2 + xy + y^2 = 7$ at the point $(3, -2)$

(5)   2.   You are on a ferris wheel. When the wheel rotates, your height above the ground at time t minutes is given by the sinusoidal function
$$h(t) = 10\sin(\frac{\pi}{2}(t-1)) \text{ meters}$$

(a) Where are you initially located (at time $t = 0$)?

(a) Find the vertical velocity $h'(t)$ and vertical acceleration $h''(t)$. What is the maximal vertical velocity? When does it happen?