

1. Anna and Burt are moving at constant speeds along straight lines in the xy -plane. They both start moving at the same time. Anna starts from the origin and reaches the point $(4, 3)$ in 1 second. Burt starts from the point $(1, 2)$ and reaches the point $(5, 8)$ in 2 seconds.
 - (a) Give Anna's parametric equations of motion.
 - (b) Give Burt's parametric equations of motion.
 - (c) Determine the time when Anna and Burt will be closest together.

2. Consider two circles of radius 1. Circle A is centered at the origin, and circle B is centered at the point $(1, 0)$. Let P be the point of intersection in the positive quadrant. Find the equation for the tangent line to circle A at P and find the equation of the tangent line to circle B at P .

3. (a) A 12 cm rod is attached to a wheel of radius 4 cm and allowed to slide along the x -axis. The wheel turns counterclockwise at 3 revolutions per minute. The rod starts laying flat on the x axis. Write the x -coordinate $Q(t)$ at time t .



(b) Find the values of x so that:
$$e^{\ln\left(\ln\left(\frac{e^x}{e^{x^2}}\right)+2\right)} = 2$$