

DUE Wednesday, September 14, 2011.

Problems to work but not hand in:

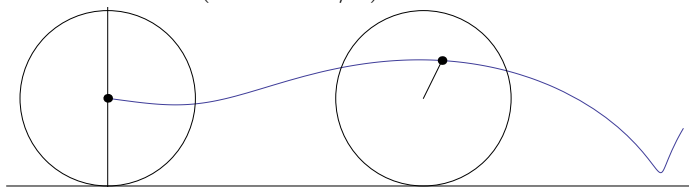
§2.2: #1, 5.

Problems to turn in:

WeBWork Homework 4

§2.1: #2 (3), 7* (4).

A. (3) An ant walks along a spoke of a wheel at a (constant) rate of 2 ft/min. The wheel has radius 5 ft and rolls (without slipping) along the x -axis with a (constant) angular velocity of 3 radian/min. Assuming the wheel starts as shown, with the ant at the center of the wheel at time $t = 0$ and moving down the vertical spoke, give the position vector of the ant t minutes later ($0 \leq t \leq 5/2$).



B. (3) Consider the surface $z = f\left(\begin{matrix} x \\ y \end{matrix}\right) = xy$. Show that through each point $P = \begin{bmatrix} a \\ b \\ ab \end{bmatrix}$ there pass two lines wholly contained in the surface.
Hint: Consider a line through P with direction vector \mathbf{v} and require that it be contained in the surface.

§2.2: #3 (3), 4 (2), 6a (2).

C. (3) Prove that $S = \left\{ \begin{bmatrix} x \\ y \end{bmatrix} \in \mathbb{R}^2 : y > x \right\}$ is an open subset of \mathbb{R}^2 .
Prove that $C = \left\{ \begin{bmatrix} x \\ y \end{bmatrix} \in \mathbb{R}^2 : y \geq x \right\}$ is a closed subset.

Challenge problems (Turn in separately):

§2.1: #5b (3), 6 (2), 12 (4+).

*Note that the answers are at the back of the book. I will get you started on this in class.