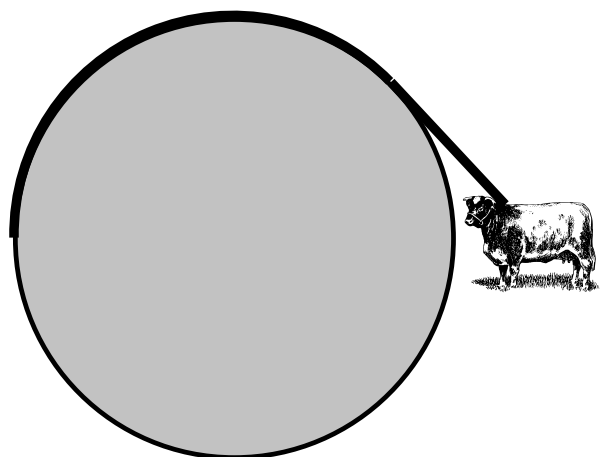


University of Lethbridge
Department of Mathematics and Computer Science
MATH 2565 - Tutorial #11
Thursday, March 29

Name: _____

Note: You may do this assignment as a group, if you wish, by listing additional names under the space above, up to a maximum of 3 students per group.

Extra fun: A cow is tied to a silo of radius R by a rope just long enough to reach the opposite side of the silo. Find the grazing area available to the cow.



1. Eliminate the parameter to obtain an equation for the curve involving only x and y :

(a) $x = \sec t, y = \tan t$

(b) $x = 4 \sin t + 1, y = 3 \cos t - 2$ (Hint: first solve for $\cos t$ and $\sin t$.)

(c) $x = \frac{1}{t+1}, y = \frac{3t+5}{t+1}$. (Hint: try doing long division on the expression for y .)

2. Find any points of self-intersection for the following curves:

(a) $x = t^3 - t - 3, y = t^2 - 3$

(b) $x = \cos(t), y = \sin(2t), t \in [0, 2\pi]$

3. Find the length of the parametric curve:

(a) $x = -3 \sin(2t), y = 3 \cos(2t), t \in [0, \pi]$.

(b) $x = e^{t/10} \cos t, y = e^{t/10} \sin t, t \in [0, 2\pi]$.

4. Find the area enclosed by the loop of the “teardrop” curve $x = t(t^2 - 1), y = t^2 - 1$. (See Figure 10.34 in the text.)

5. For each curve below, find the equation of the tangent line at the given value of t . Also: find all points where the tangent line is horizontal or vertical.

(a) $x = t^2 - 1, y = t^3 - t, t = 1.$

(b) $x = \cos(t), y = \sin(2t), t = \pi/4$