

MATH 306

Homework 3

DUE: THURSDAY FEBRUARY 1, 2007

For all the problems below, you can use modern methods, though you should always follow directions and use the strategy the problem suggests. Just to be clear, the point of a lot of these problems is to be really impressed at the difficult geometric and algebraic problems the Egyptians and Babylonians could solve (without any real algebra...). And also, to get a feel for how bad or good were their approximations – of π or of a particular geometric formula, etc.

Section 2.4 #1,2,6,8,9

Turn in: #1c,2a,8,9

Section 2.5 #1,3,4,9,12

In #4, an algebraic identity is suggested. I want you to draw the geometric version of this identity with written explanation as we did for the identity $a^2 - b^2 = (a + b)(a - b)$.

Turn in: #4,9,12

Section 2.6 #1,5,6,8

Turn in: #8

Problem A: (to turn in) While the Babylonians did not have as good an approximation of π as the Egyptians, they did have the following formula for area of a circle: $A = (Cd)/4$ where C is circumference and d is the diameter.

(a) Show, using modern formulas, that this expression is correct.

(b) Derive the formula that way the Babylonians may have. Imagine the disc (interior of the circle) as being filled by concentric circles. (See picture below). Take a pair of scissors and cut all the circles. Uncurl them. What geometric shape do you get? What is its area?