For week 3 (starting 23 Jan 2006)
(Not all problems may be discussed in class, problem 8 & 9 are homework to be handed in during the following week on tutorial)

1. What are the decimal equivalent (i.e. our familiar notations) of the Egyptian numbers in hieroglyphs highlighted with red circles:

2. Write the following numbers using Egyptian hieroglyphs:
   (a) 100,   (b) 55,   (c) 234,   (d) 1024,
   (e) 123470,   (f) 1111111.

3. Add the Egyptian numerals after rewriting the following in hieroglyphs:
   (a) 234 + 765,   (b) 4555 + 5648,   (c) 36486 + 9018.

4. The "doubling" method of Egyptian multiplication requires writing any whole number (positive integers) as the sum of powers of two, with no repetitions. For example, $45 = 32 + 8 + 4 + 1$. Try this for each of the following (using our familiar Hindu-Arabic numerals):
   (a) 73,   (b) 52,   (c) 98,   (d) 151.

5. Multiply using the Egyptian method of doubling (using hieroglyphs and our notation):
   (a) 19×29,   (b) 25×73,   (c) 71×211.

6. Write the following fractions using hieroglyphs, denote in the Egyptian way as sum of unit numerator fractions, if necessary.
   (a) 1/5,   (b) 1/63,   (c) 3/10,   (d) 7/50.

7. Perform the following divisions using the Egyptian "doubling" method:
   (a) $75 \div 15$,   (b) $156 \div 13$,   (c) $806 \div 35$.

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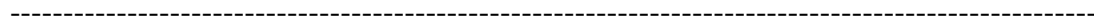
8. (**Homework**) Perform the following calculation, the Egyptian way (in hieroglyphic):
   (a) 34×82,   (b) $528 \div 22$,   (c) $48 \div 7$.

9. (**Homework**) If we know that the volume of a regular pyramid is
   $$V = \frac{1}{3}ha^2$$
   where h is the height of the pyramid, and a is the baseline width of the pyramid, derive the result for the truncated pyramid
   $$V = \frac{h}{3}(a^2 + ab + b^2)$$
   where h is the height of the truncated pyramid, a and b are the bottom and top length of squares. [Hint: need the property of similarity triangles.]