

January 29, 2010

FIRST MIDTERM EXAMINATION

Please use no notes and no books. Please use no calculators and no other electronic devices. Give complete answers; in particular, show calculations.

1. (18%) Consider the following multiplication problem. 19×53

Express the numbers in Ancient Egyptian notation. Carry out the multiplication in the Ancient Egyptian fashion and numerals. Translate the answer to our modern decimal notation.

2. (28%) For each person, indicate the appropriate time period and contribution:

Nicomachus of Gersa	_____	_____
Pythagoras of Samos	_____	_____
Jean Francois Champollion	_____	_____
Henry Creswicke Rawlinson	_____	_____
Otto Neugebauer	_____	_____
Ahmes	_____	_____
Thales of Miletus	_____	_____

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|-----------------|-------------------------|----------------------|
| A. c. 1620 B.C. | B. c. 625 – c. 547 B.C. | C. c. 585 - 501 B.C. |
| D. fl. 100 | E. 1790 – 1832 | F. 1810 – 1895 |
| | G. 1899 – 1990 | |

- I. Copied an older mathematical work
- II. Studied figurate numbers. Had dictum: “All is number.”
- III. The Greeks wrote that he made proofs part of mathematics
- IV. A neo-Pythagorean who wrote an important book on arithmetic (number theory)
- V. Translated many astronomical and mathematics Babylonian tablets
- VI. Was the first to translate the ancient Egyptian hieroglyphics
- VII. Made major contributions to the modern ability to read ancient cuneiform writing

3. (18%) Recall the identity that $(x - y)^2 + 4xy = (x + y)^2$. Consider the following problem:

The area of a rectangle is 84 square cubits.

The difference between the sides is 8 cubits.

Find the lengths of the sides.

Use the identity to solve for the sum of the lengths of the sides of the rectangle.

Find a number such that the sides can be expressed as that number plus an unknown number and the number minus the same unknown number. (We can assume that x is the longer side, that is, $x > y$.)

Find the unknown number from the given area.

Find the two sides of the rectangle.

4. (18%) (For this problem, you do not need to use the Egyptian numerals nor the Egyptian methods of multiplying and dividing.) Use the Method of False Position to solve the following problem. The final answer is an integer plus a fraction. Write the fraction as an Egyptian fraction using our usual numerals.

A quantity times $2\frac{1}{12}$ equals 80.

To find the quantity, start with false assumption that the quantity is 12.

5. (18%) Consider the depicted tablet and its partial translation. What is the culture that created the tablet? What do the symbols on the tablet mean? What does the tablet indicate about the knowledge of the culture that made it?

