

College of the Holy Cross, Fall 2016
MONT 106Q – Mathematical Thinking
Midterm Exam, November 4, 2016

Your Name: _____

Directions

Do all work on the sheets provided (if you use the back of a sheet, please place a note telling me to look there). There is an extra blank sheet of paper at the end that you can use either as scratch paper or as extra space for your essay. You may detach that if you like, but please put your name on it and hand it in with your exam if you do detach it. The numbers in parentheses next to the questions are their point values (100 points total).

Please do not write in the space below

Problem	Points/Poss
I	/ 20
II	/ 20
III	/ 20
IV	/ 40
Total	/100

I. A) (10) Express the base 2 number $(1010110)_2$ in base 10.

B) (10) Express the base 10 number 137 in base 2.

II. Compute “the Egyptian way”

A) $(10) 54 \times 763$

B) $(10) 1332 \div 12$ (that is, “calculate with 12 to yield 1332”)

III. Short answer. Answer any four of the following. If you answer more than four, the best four will be used.

A) (5) What base 10 number is represented by these Egyptian hieroglyphs?

B) (5) What base did the Maya use in their number system? How would a Maya scribe have represented the number 151?

C) (5) What are the principal surviving records of Egyptian mathematics and what are their approximate dates?

D) (5) What was special about the Egyptian way of dealing with fractions?

E) (5) What was the *meaning* of the numerical information in the section of the Maya *Dresden Codex* that we studied in Discussion 1?

F) (5) The “months” in the Maya *tzol'kin* calendar are, in order,

1.	Imix	11.	Chuen
2.	Ik	12.	Eb
3.	Akbal	13.	Ben
4.	Kan	14.	Ix
5.	Chicchan	15.	Men
6.	Cimi	16.	Cib
7.	Manik	17.	Caban
8.	Lamat	18.	Etnab
9.	Muluc	19.	Ahab
10.	Oc	20.	Ahau

What are the next 3 days after the day 11 Ahab in this system?

IV. Essay. (40) Explain in detail two examples of mathematical problems that Christopher Boone discusses in *the curious incident of the dog in the night-time*. What do those problems mean for him? More generally, what is the role of mathematics in his life? Is it fair to say that he relates to the world in mathematical terms? Why or why not?

