

Math 105 History of Mathematics

Assignments

Prof. D. Joyce, Fall 2008

Pages refer to the third edition of the text. Where there is no corresponding exercise in the second edition, the statement of the exercise is given; otherwise, a reference to the problem in the second edition.

Assignment 7. Due Monday, Nov. 10.

Part I. Write up a rough outline for your paper, just the major topics, not the subtopics. This is to help you organize. You might not actually follow this outline later on. Here are some things you might include if, say, you're writing about a particular mathematical work by a particular mathematician: an introduction where you briefly describe the work and the mathematician, previous works that led up to this work, a short biography of the mathematician, details of the work, the importance of the work, later mathematics that the work influenced. If you're not doing a particular mathematical work, then you'll probably have very different kinds of major topics.

Part II. Exercises from the text.

In the second edition, pages 283–284, exercises 5 and 36.

In the third edition, pages 318–320, exercises 4 and 36.

Assignment 6. Due Monday, Nov. 3.

Part I. Find a primary source for your topic, and at least two secondary sources. You can use the *Dictionary of Scientific Biography* in the reference section of Goddard Library, our text, and web references to find a primary source and at least two secondary sources (besides our text book and the Dictionary of Scientific Biography). These can be books or articles in journals. Be wary of articles on the web, since they vary greatly in quality. Some are excellent, though. I will be happy to help you find some sources.

Part II. Exercises from the text. These four exercises appear in both the second and third editions.

In the second, page 233–235, exercises 1, 7a, 34.

In the third, page 227, exercises 18 and 21, and on page 262, exercise 14.

Assignment 5. Due Monday, Oct 27.

Part I. Select a topic for a class presentation and a paper. Later, if you find that you want to change topics, you may do so.

Your topic will be (1) a mathematician, (2) a particular mathematical work or part of a work, or (3) a topic in mathematics or associated mathematical field during a suitably

narrowed period of time. In any case, you will need at least one primary source, that is, a mathematical work either in the original language or translated into English or any other language you can read.

Write down a tentative title for your topic and one or two sentences to explain what you'd like to study.

Part II. Exercises from the text. These four exercises appear in both the second and third editions.

In the second, page 129, exercises 1, 2, 4, and on page 189, exercise 8.

In the third, page 127, exercises 1, 2, 3, and on page 191, exercise 8.

Assignment 4. Due Wednesday, Oct 1. On the *Elements*. These five exercises appear in both the second and third editions.

In the second, starting on page 97, exercises 11, 12, 17, 20, 22.

In the third, starting on page 90, exercises 6, 7, 14, 17, 19.

Assignment 3. Due Friday, Sep 26. On early Greek mathematics. These five exercises appear in both the second and third editions.

In the second, page 97, exercises 3, 4, 5, 6, 10.

In the third, page 47, exercises 8, 9, 10, 11, 13.

Assignment 2. Due Monday, Sep 15. On ancient Babylonian mathematics.

1. Page 29, ex. 17: Convert the fractions $7/5$, $13/15$, $11/24$, and $33/50$ to sexagesimal notation.

2. Page 29, ex. 18: Convert the sexagesimal fractions $0;22,30$, $0;08,06$, $0;04,10$, and $0;05,33,20$ to ordinary fractions in lowest terms.

3. Page 29, ex. 19. (Page 40, ex. 11 in 2nd ed)

4. Page 29, ex. 20: In the Babylonian system, multiply 25 by 1,04 and 18 by 1,21 Divide 50 by 18 and 1,21 by 32 (using reciprocals). Use our standard multiplication algorithm modified for base 60.

5. Page 29, ex. 24. (Page 41, ex. 29 in 2nd ed)

6. Page 29, ex. 25. (Page 41, ex. 30 in 2nd ed)

7. Page 29, ex. 28: solve the problem from the Old Babylonian tablet BM 13901: The sum of the areas of two squares is 1525. The side of the second square is $2/3$ that of the first plus 5. find the sides of each square. (You may use modern methods to find the solution.)

Assignment 1. Due Wednesday, Sep 10. On ancient Egyptian mathematics. Solve these problems using Egyptian methods.

1. Page 28, ex. 2: Use Egyptian techniques to multiply 34 by 18 and to divide 93 by 5.

2. Page 28, ex. 3: Use Egyptian techniques to multiply $\bar{2} \bar{14}$ by $1 \bar{2} \bar{4}$.

3. Page 28, ex. 5: Show that the solution to the problem of dividing 7 loaves among 10 men is that each man gets $\bar{3} \bar{30}$

4. Page 28, ex. 7. (Page 39, ex. 6 in 2nd ed)

5. Page 28, ex. 8. (Page 39, ex. 7 in 2nd ed)

6. Page 28, ex. 14: Solve problem 11 of the *Moscow Mathematical Papyrus*: The work of a man in logs; the amount of his work is 100 logs of 5 handbreadths diameter; but he

has brought them in logs of 4 handbreadths diameter. How many logs of 4 handbreadths diameter are there?