

# More short answer questions with answers

Here are short answers to three questions that were in one of the summary files:

- (1) Describe one similarity and one difference between the mathematical work done during the Ionian and late Hellenistic periods.
- (2) What were the differences between the approach to irrational numbers in Egyptian and Babylonian mathematics and the approach in Post-Pythagorean Greek mathematics?
- (3) For each of the Egyptian, Babylonian and Greek schools of ancient mathematics, determine whether or not their descriptions for fractions always gave the precise values.

And here are valid answers.

**Question 1.** During both periods there was a greater emphasis on numbers than in the Athenian and main Hellenistic periods. However, one major difference is that late Hellenistic mathematics studied numerous problems related to astronomy and some other sciences. An additional difference is that late Hellenistic mathematics built upon a substantial legacy of earlier Greek mathematics, while Ionian mathematics provided important first steps towards forming that legacy.

**Question 2.** Both Egyptian and Babylonian mathematicians viewed irrational numbers in terms of suitable rational approximations, while the Greeks recognized a difference between such objects. From the Greek perspective, rational numbers were viewed as substantially different from irrational numbers, and in effect they had two number systems, one of which was the rational numbers, and the other of which was the measurement information about geometrical figures; however, the Post-Pythagorean Greeks also recognized that this measurement information could be estimated effectively by means of rational numbers.

**Question 3.** Egyptian fractions were precise but a little awkward for computational purposes, Babylonian expressions for fractions were in general only approximations to within  $1/216,000$  (a specific example in <http://math.ucr.edu/~res/math153-2020/week2/unit01/history01.pdf> is  $1/7$ ), and Greek expressions in terms of ratios were precise and very close to the modern concept.