Babylonian and Egyptian geometry—a very brief overview

Ancient Babylonian and Egyptian mathematicians seem to have been concerned primarily with arithmetic calculations, and probably didn't regard geometry as a separate branch of mathematics. However, we do have a few extant examples of ancient geometry, mostly calculations of area and volume.

Here is an excerpt[1] from the Rhind Papyrus, an Egyptian mathematical text dated to approximately 1650 BCE (though the writer said it was actually a transcription of another document from 200 years before that).

> *Example of a round field of diameter 9 khet. What is its area? Take away 1/9 of the diameter, 1; the remainder is 8. Multiply 8 times 8; it makes 64. Therefore it contains 64 setat of land.*

Here are some features of this excerpt that are characteristic of ancient Babylonian and Egyptian mathematics:

- It's pretty accurate. The relationship between area A and radius r is $A = 64d^2/81 = (256/81)r^2$, which is equivalent to approximating $\pi \approx 256/81 = 3.16049\ldots$. This is not bad at all, and would be perfectly fine for any applications the Egyptians used it for.
- Mathematics is described verbally instead of symbolically. In modern notation, we can rewrite the relationship between area A and diameter d given in the excerpt as

  $$A = (d - d/9)^2 = \frac{64}{81}d^2$$

  but the Egyptians lacked the notational tools to do this (to be fair, Western mathematics didn't come up with modern algebraic notation until the 1600s or so).[2]
- In these cultures, mathematics was concerned with solving applied, practical problems. Rather than talking about the area of a circle, the problem talks about a "round field". There is little, if any, geometric abstraction in extant Babylonian and Egyptian texts.
- We have no idea what a "khet" or a "setat" is, but we can infer it from context; one setat is presumably one square khet. In particular, they had units of measurement.
- The Babylonian and Egyptian writings tend not to include explanations (much less formal proofs). There's more focus on how to solve a problem (by following an algorithm) than why the given solution works.

Question to ponder. Imagine you are an ancient Babylonian. How might you have come up with this rule?

More reading.

- MacTutor: Babylonian mathematics
- MacTutor: Egyptian mathematics

[1] Taken from Stahl, chapter 2, p. 1

[2] One wonders what elements of modern mathematics notation will become obsolete in a millennium or two.