Problems of Different Cultures

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Babylonia-Tablet Collections (2000-1000 B.C.):

Thousands of Babylonian clay tablets have been discovered.
Most have been unearthed at the sites of the ancient cities of Nippur and Susa.
About 400 of these tablets are known to contain mathematical material,
but few been deciphered.

1. I have added the area and two thirds the side of my square, and it is 35 /60.

What is the side of the square?

Answer: 1 / 2 unit.

Egypt-Rhind Papyrus (1650 B. C.):

Rhind Papyrus was written nearly in 2000 B. C.
It is a source that gives knowledge about ancient Egyptian mathematics.
This papyrus includes 87 problems and their solutions.

2. Divide 100 loaves among 10 men
including a boatman, a foreman, and a doorkeeper,
who receive double portions.

What is the share of each?

Answer: Regular share, 100 / 13 loaves; special share, 200 / 13 loaves.

China-Nine Chapters on the Mathematical Arts (100 B.C.):

A collection of 246 problems and their solutions.
The problems all pertain to the bureaucratic needs of the Chinese empire.
The problems are divided into nine chapters,
with each chapter focusing on a specific application.

4. A tree is 20 feet tall and has a circumference of 3 feet. Three is a vine that winds seven equally spaced times around the tree and reaches to the top.

What is the length of the vine?

Answer: 29 feet.

Second Translation

- A tree of height 20 feet has a circumference of 3 feet. There is an arrowroot vine which winds seven times around the tree and reaches the top.

  What is the length of the vine?

  [Answer: 29 ft.]

Greece-Greek Anthology (A.D. 500):

A collection of 46 problems assembled by **Metrodorus**.

The problems are set in a witty or riddle form.

5. Democharesh has lived a fourth of his life as a boy, a fifth as a youth, and a third as a man, and has spent 13 years in his old age.

How old is he?

Answer: 60.

Propositions for Sharpening the Wits of the Young (A.D. 800):

A collection of 53 puzzle problems compiled by the monk **Alcuin of York.**

6. A ladder has 100 steps. On the first step sits 1 pigeon; on the second, 2; on the third, 3; and so on up to the hundredth.

How many pigeons in all?

Answer: 5050

Islamic World – The Algebra of al Khwarizmi (A.D. 820):

Khwarizmi wrote an algebraic book named “El’ Kitab’ül-Muhtasar fi Hısab’il Cebri ve’l-Mukabele” .
Khwarizmi combined mathematical knowledge of Greeks and simple equations of Indians with this book.

7. You have two sums of money, the difference of which is 2 dirhams; you divide the smaller sum by the larger and the quotient is equal to 1 / 2.

What are the two sums of money?

Answer: 4 dirhams and 2 dirhams.

Egypt-Cairo Papyrus (250 B.C.):

A collection of 40 problems, 9 of which concern **right triangles**.

3. An erect pole of 10 cubits has its base moved 6 cubits.

Determine the new height and the distance the top of the pole is lowered.

Answer: 9 cubits; 2 cubits.

India-Lilavati (A.D. 1150):

A text written by the mathematician-astronomer Bhaskara II
and named after his daughter.
This work is a summary of 500 years of Hindu mathematics tradition.

8. One fourth of a herd of camels was seen in the forest;
twice the square root of that herd had gone to the mountain slopes;
and 3 times 5 camels remained on the riverbank.

What is the numerical measure of that herd of camels?

Answer: 36 camels.

Italy-Liber Abaci (A.D. 1200):

This book is written by Italian mathematician **Fibonacci.**
The book consisted of 15 chapters devoted to techniques of arithmetics and simple algebra.

9. Two towers, the heights of which are 30 paces and 40 paces, have a 50 paces distance. Between the two towers there is a font where two birds,
flying down from the two towers at the same speed will arrive at the same time.

What is the distance of the font from the two towers?

Answer: 18 paces.

England-A Treatise of Arithmetic (A.D. 1880):

A standard British text of the time, written by J. Hamblin Smith.

10. If 12 horses can plow 96 acres in 6 days,
how many horses will plow 64 acres in 8 days?

Answer: 6 horses

Next similar problems

A wooden log is encased in a wall.
If we cut part of the wall away, at a depth of 1 inch,
the width of the exposed log measures 1 foot.

What is the diameter of the log?
[Answer: 37 inches.]

Babylonia, 1800-1600 B.C.

- A beam of length 30 feet stands against a wall.
  The upper end has slipped down a distance of 6 feet.

  How far did the lower end move?

  [Answer: 18 ft.]

China, 300 B.C.

- The height of a wall is 10 feet.
  A pole of unknown length leans against the wall so that its top is even with the top of the wall.
  If the bottom of the pole is moved 1 foot farther from the wall, the pole will fall to the ground.

  What is the length of the pole?

  [Answer: 50.5 ft.]

Indeterminate equations

576 coins have been paid for the purchase of 78 bamboo poles. It is desired to calculate prices for large and small poles.

How much is the price of each? (China, C.E. 300)

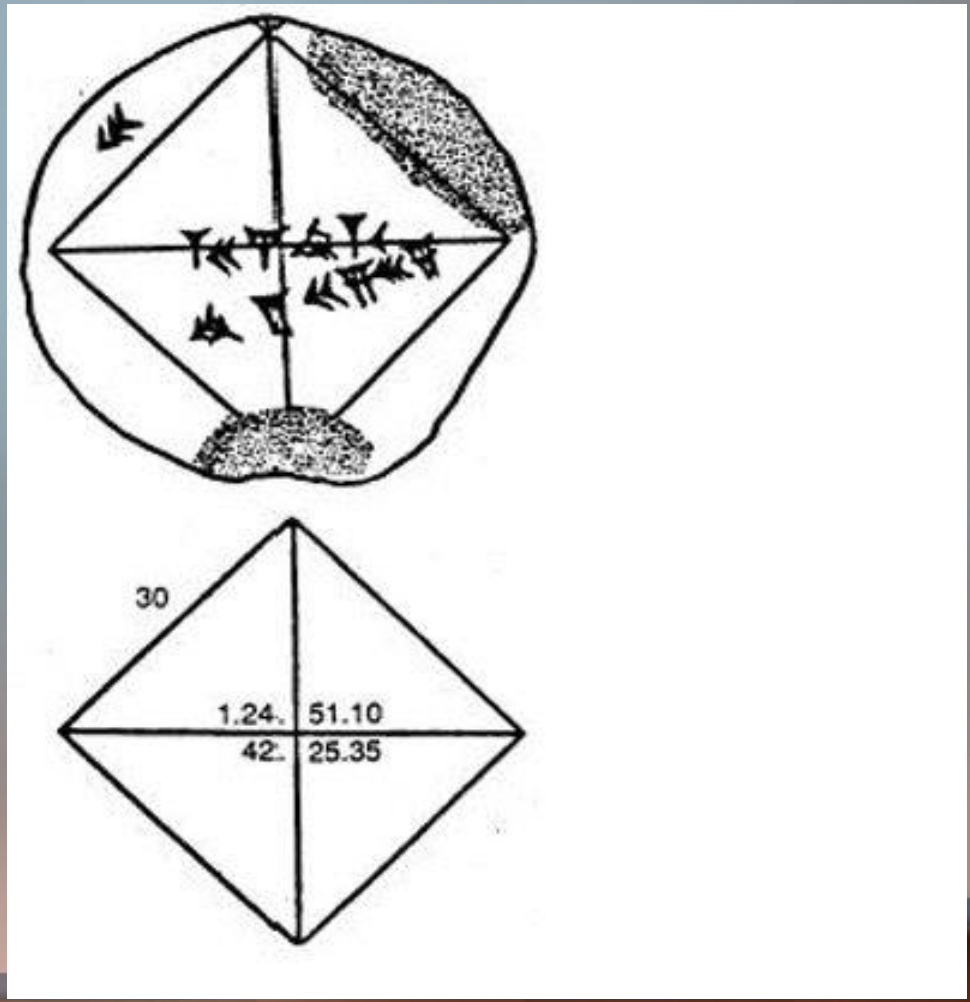
[An answer: 48 small poles at 7 coins each; 30 large poles at 8 coins each]

A hundred bushels of grain are distributed among 100 persons in such a way that each man received 3 bushels, each woman 2 bushels, and each child half a bushel.

How many men, women, and children are there? (Europe, 775)

[An answer: 20 men, 0 women, and 80 children]

Hexadecimal System - Babylonia



Egypt – 250 B.C.

For example, the height of the mast of an Egyptian ship for the period 250 B.C.E. can be found:

If it is said to you, “Have a sailcloth made for the ships” and it is further said, "Allow 1000 cloth cubits (square cubits) for one sail and have the ratio of the height of the sail to its width as 1 to 1 1/2."

What is the height of the sail?
(1 cubit = 20 inches)

[Answer: 25.8 cubits]

Venice, 15th Century

The size of a loaf of bread in fifteenth-century Venice can be deduced:

When a bushel of wheat is worth 8 lire, the bakers make a loaf of bread weighing 6 ounces;

required the number of ounces in the weight of a loaf when wheat is worth 5 lire a bushel.

[Answer: 9 3/5 ounces]

North America – Post-Civil War

The hourly wages (of a twelve-hour workday)
for a man in post-Civil War America can be determined:

A gentleman received $4 a day for his labor, and pays $8 a week for his board; at the expiration of 10 weeks he has saved $144;

required the number of idle and working days.

[Answer: 14 idle days and 56 working days]

Rennaissance Italy, 15th Century

Three men, **Tomasso**, **Domengo** and **Nicolo**, entered into partnership.
Tommaso put in 760 ducats on the first day of January, 1472, and on the first day of April took out 200 ducats.
Domengo put in 616 ducats on the first day of February, 1472, and on the first day of June took out 96 ducats.
Nicolo put in 892 ducats on the first day of February, 1472, and on the first day of March took out 252 ducats.
On the first day of January, 1475, they found that they had gained 3168 ducats, 13 grossi and 1/2.

Required the share of each, so that no one shall be cheated. (1 ducat = 24 grossi)

[Answer: Tomasso, 1061 ducats, lg; Domengo 949 ducats, 19 1/2 g; Nicolo 1157 ducats, 17g]

The answer is: 816816 lots / day
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Künstliche Rechnung, Christoff Rudolff, 1526

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Under Siege

One hundred men besieged in a castle have sufficient food to allow each one bread to the weight of 14 lot a day for ten months.
Seven months and twenty days later,
they are warned that the castle can receive no help for four months longer.

**How much bread should each man be allotted,
counting each month as thirty days?**

Answer: 8 1/6 lot/day

Brahmasphutasiddhanta, Brahmagupta, 628

**Find a number having
remainder 29 when divided by 30
and remainder 3 when divided by 4.**

Answer: 59 + 60*n*, where *n* is an integer.

Christiaan Huygens challenge to Gottfried Leibniz, Paris, 1672

What is the sum of the reciprocals of the triangular numbers?

Answer is 2.