BRAIN TEASERS

SIX CLASSIC FAMILY AND AGE PUZZLES, WITH ANSWERS

EASY TO HARD | 6 PUZZLES | ANSWERS INCLUDED

Who is related to whom, how old is everyone, and who gets what. Six puzzles about families, starting easy and finishing hard. They come from Amusements in Mathematics by Henry Ernest Dudeney, published in 1917, in his own words.

NO. 1 · EASY

HEARD ON THE TUBE RAILWAY

First Lady: "And was he related to you, dear?"

Second Lady: "Oh, yes. You see, that gentleman's mother was my mother's mother-in-law, but he is not on speaking terms with my papa."

First Lady: "Oh, indeed!" (But you could see that she was not much wiser.)

How was the gentleman related to the Second Lady?

In plain English: Two women are talking on a London Underground train. How is the man they are talking about related to the second woman?

He is her uncle.

Take the sentence apart one piece at a time, starting with the part closest to her.

1. **"My mother's mother-in-law"** is her mother's husband's mother. Her mother's husband is her father, so this is **her father's mother: her grandmother**.
2. **"That gentleman's mother"** is that same grandmother. So he is one of her grandmother's sons.
3. A grandmother's son is either **your father or your uncle**.
4. He is not on speaking terms with her papa, so he is not her papa. **He is her uncle**, her father's brother.

So two brothers have fallen out, and the second woman is the niece in the middle.

NO. 2 · EASY

MOTHER AND DAUGHTER

"Mother, I wish you would give me a bicycle," said a girl of twelve the other day.

"I do not think you are old enough yet, my dear," was the reply. "When I am only three times as old as you are you shall have one."

Now, the mother's age is forty-five years. When may the young lady expect to receive her present?

In 4½ years, when she is 16½ and her mother is 49½.

The key is the gap between their ages. Her mother is 45 and she is 12, so her mother is **33 years older**. That gap never changes, however old they get.

1. When one person is three times another's age, the gap between them is twice the younger one's age. (A girl of 10 and a mother of 30 are 20 years apart, which is twice 10.)
2. The gap here is 33. So on the day she gets the bicycle, twice her age is 33, and **she is 16½**.
3. She is 12 now, so that is 16½ − 12 = **4½ years away**.

Check it. In 4½ years her mother will be 45 + 4½ = 49½, and 16½ × 3 = 49½.

NO. 3 · MEDIUM

MRS. TIMPKINS'S AGE

Edwin: "Do you know, when the Timpkinses married eighteen years ago Timpkins was three times as old as his wife, and to-day he is just twice as old as she?"

Angelina: "Then how old was Mrs. Timpkins on the wedding day?"

Can you answer Angelina's question?

She was 18 on her wedding day, and he was 54.

The gap between their ages cracked the last puzzle, and it cracks this one too. They have both aged 18 years since the wedding, so the gap is the same now as it was then.

1. On the wedding day he was three times her age, so **the gap was twice her age on the wedding day**. (If she was 10 and he was 30, the gap was 20.)
2. Today he is twice her age, so **the gap is exactly her age today**. (If she is 20 and he is 40, the gap is 20.)
3. The gap has not changed. So twice her wedding-day age is the same as her age today.
4. Her age today is her wedding-day age plus 18. So twice her wedding-day age is her wedding-day age plus 18, which means **her wedding-day age is 18**.

Check it. On the wedding day she was 18 and he was 54, three times as old. Eighteen years later she is 36 and he is 72, twice as old.

NO. 4 · MEDIUM

THE BAG OF NUTS

Three boys were given a bag of nuts as a Christmas present, and it was agreed that they should be divided in proportion to their ages, which together amounted to 17½ years. Now the bag contained 770 nuts, and as often as Herbert took four Robert took three, and as often as Herbert took six Christopher took seven. The puzzle is to find out how many nuts each had, and what were the boys' respective ages.

In plain English: The nuts are shared out in the same proportions as the boys' ages. For every 4 nuts Herbert takes, Robert takes 3. For every 6 Herbert takes, Christopher takes 7. How many nuts does each boy get, and how old is each one?

Herbert gets 264 nuts and is 6. Robert gets 198 and is 4½. Christopher gets 308 and is 7.

Both sharing rules mention Herbert, but one says 4 and the other says 6. Make them match first.

1. **Herbert 4, Robert 3** is the same as **Herbert 12, Robert 9**. (Times 3.)
2. **Herbert 6, Christopher 7** is the same as **Herbert 12, Christopher 14**. (Times 2.)
3. So in one round of sharing, Herbert takes 12, Robert 9 and Christopher 14. That is 12 + 9 + 14 = **35 nuts a round**.
4. 770 ÷ 35 = **22 rounds**.
5. Herbert gets 12 × 22 = **264**. Robert gets 9 × 22 = **198**. Christopher gets 14 × 22 = **308**. Check: 264 + 198 + 308 = 770.

Now the ages. They are in the same proportions, 12 to 9 to 14, and they add up to 17½. Those three numbers add up to 35, which is exactly twice 17½, so halve each one. Herbert is **6**, Robert is **4½** and Christopher is **7**.

NO. 5 · MEDIUM

A LEGAL DIFFICULTY

"A client of mine," said a lawyer, "was on the point of death when his wife was about to present him with a child. I drew up his will, in which he settled two-thirds of his estate upon his son (if it should happen to be a boy) and one-third on the mother. But if the child should be a girl, then two-thirds of the estate should go to the mother and one-third to the daughter. As a matter of fact, after his death twins were born, a boy and a girl. A very nice point then arose. How was the estate to be equitably divided among the three in the closest possible accordance with the spirit of the dead man's will?"

In plain English: The will says: if the baby is a boy, he gets two-thirds and his mother one-third. If it is a girl, her mother gets two-thirds and she gets one-third. Twins arrive, one of each. What is the fairest way to share it?

The son gets four-sevenths, the mother two-sevenths and the daughter one-seventh.

The fractions in the will cannot all be kept, because together they come to more than the whole estate. What can be kept is who was meant to get more than whom.

1. If it was a boy: son two-thirds, mother one-third. So **the son was to get twice as much as the mother**.
2. If it was a girl: mother two-thirds, daughter one-third. So **the mother was to get twice as much as the daughter**.
3. Keep both. Give the daughter 1 share. The mother gets twice that: **2 shares**. The son gets twice the mother: **4 shares**.
4. That is 1 + 2 + 4 = **7 shares** in all.

So the estate is cut into sevenths. If it were worth 7,000, the son would get 4,000, the mother 2,000 and the daughter 1,000.

NO. 6 · HARD

A MIXED PEDIGREE

Joseph Bloggs: "I can't follow it, my dear boy. It makes me dizzy!"

John Snoggs: "It's very simple. Listen again! You happen to be my father's brother-in-law, my brother's father-in-law, and also my father-in-law's brother. You see, my father was…"

But Mr. Bloggs refused to hear any more. Can the reader show how this extraordinary triple relationship might have come about?

In plain English: John tells Joseph that Joseph is three things to him: his father's brother-in-law, his brother's father-in-law, and his father-in-law's brother. How can one man be all three?

Three marriages between the two families do it.

Take the three relationships one at a time. Each one needs a Snoggs to marry a Bloggs.

1. **"My father's brother-in-law."** John's father married Joseph's sister, Kate Bloggs. That makes Joseph his brother-in-law.
2. **"My brother's father-in-law."** John's brother, Alf, married Joseph's daughter, Mary. That makes Joseph Alf's father-in-law.
3. **"My father-in-law's brother."** John himself married Jane, the daughter of Joseph's brother Henry. Henry is John's father-in-law, and Joseph is Henry's brother.

Here is the whole family in one place.

- **The Bloggs side:** Joseph, his brother Henry and his sister Kate.
- **Kate Bloggs** married Mr. Snoggs. Their sons are John and Alf.
- **Alf Snoggs** married Joseph's daughter, **Mary Bloggs**.
- **John Snoggs** married Henry's daughter, **Jane Bloggs**.

And since Kate is John's mother, Joseph is his uncle as well. No wonder he felt dizzy.

All six are from Amusements in Mathematics (1917), which is in the public domain. The worked answers are our own.