

The Trolley Puzzles

Introduction and Puzzle 1

You have walked this way before, hearing the din of machinery lower down. But this time, something urges you to take a closer look. You disregard the 'Danger: Do Not Enter' sign and slip through to where you might get a view of what exactly is going on below. When you find a suitable place for looking down on the railyard, you are surprised to see an old woman standing there, surveying the scene. She smiles and winks at you conspiratorially. Below, you see a jumble of tracks, with train cars, trolleys, and shipping containers scattered about.

"So, you had to come see it, too," she says. You nod. "I know the feeling. I've been coming here for many, many years. I don't know what keeps me coming back. You know, a very long time ago, this place inspired me to develop some philosophical ideas you may have heard of. Are you aware of the 'trolley problem'?"

"Oh, yes," you say. "Isn't that the one where, to save the lives of five people on one track, you have to divert a trolley to a different track where it will instead kill one person?"

"That's the basic idea," she says, "though the analysis of it is what matters. And there are quite a number of variations on the theme. But I don't know how much you want to hear me natter on about philosophy: you just got here, and you probably want some time to take a look around at all this. Would you like to borrow my binoculars?"

You accept her kind offer, and find the binoculars amazingly strong: you can even make out the playing cards on a table in a game that seems to have been abandoned by some of the railyard workers. "But I can't figure out what game they might have been playing: it seems very strange."

"The game isn't what matters," the old woman says. "What's more interesting is what it tells you. If you look closely and think about it, you'll find that there's a hidden message there: a secret word. Can you figure out what it is?"

Can **you** figure out the secret word? See for yourself!

1.

2.

3.

4.

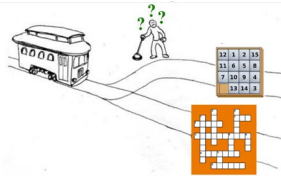
5.

6.

7.

Answer:

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Puzzle 2

You solve the old woman's puzzle and tell her that you'd be interested to hear a little bit about philosophy. "But I have to warn you, I don't know that much about it," you add. "Just a little bit about that 'I think, therefore I am' guy – what was his name?" She tells you that it's 'Rene Descartes', and you remember seeing it written down somewhere, but the way she says it isn't at all the way you thought it would sound. In your notebook, you make a note of the pronunciation she uses: **wren – aid – ache- art**. Feeling whimsical, you replace these four words with their definitions:

Small brown songbird / assist / dull pain / skill or craft.

Your new friend tells you about some of the philosophers she knows at Rutgers. Eventually, she looks at your notebook and sees your unusual way of keeping track of their names. She smiles mischievously and adds some mysterious numbers to the end of each of your paraphrases, so that the page in your notebook ends up looking like this:

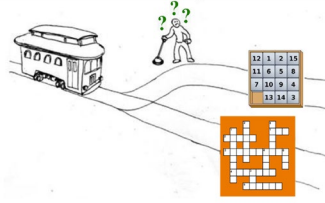
Decorative vase ___ / Moray, for example ___ / Backtalk ___ / Rowing need ___ (5)
Mind ___ / Little devil ___ / Corral ___ / Receive as profit ___ (2)
Tolerate ___ / Fishing rod attachment ___ / One in the red ___ (4)
Belonging to me ___ / Select from a group ___ / Quaker rolls them ___ / Arab market ___ / "I see!" ___ (1)
Wise bird ___ / Defeat ___ / Frighten ___ / Pointer ___ (7)
Challenge ___ / Morty's grandfather ___ / 2022 Blanchett film ___ / Social insect ___ (1)

"And those numbers mean... what exactly?", you ask.

"Well, you know their last names..." she begins, trailing off.

"Don't tell me there's another secret word here for me to find!"

There is. And the secret word is _____



The Trolley Puzzles

Puzzle 3

“That was tricky,” you say. You see that the old woman is now staring toward an array of shipping containers, four containers high and five containers wide.

“Doesn’t that just show how *near* everyone is to everyone else, in a sense, today? Look at that: items from Wales, Oman, Thailand, Ecuador, and so many other places right next to each other! I remember when things were not so open, long ago. It makes me so happy just to see this!”

“But how can you tell which container comes from where?”, you ask. “I guess I don’t know the signs as well as you do. You’ve clearly been coming here often.”

She nods. “Yes, I suppose so... well, I can give you a few hints, if you’re interested.”

“1. The first letters of the shipping containers’ nations spell out the final answer to Puzzle 2, if you begin at the upper left corner and move only along a path between containers that are vertically, horizontally, and diagonally adjacent, never touching the same container twice.

“2. The opposite edges of the array (right and left) both have crates from Thailand, and both have crates from Rwanda. The Rwandan and Thai crates are in the same relative positions on both edges.

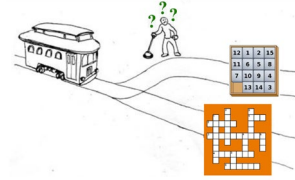
“3. The order of three consecutive crates in one row, from left to right, is China – Lebanon – Uganda.

“4. One pair of distant corners (that is, corners that don’t share a row or column) is occupied by containers from Haiti and Norway. The two Norwegian containers are a knight’s move apart from each other, as are the two Haitian crates, and as are one Haitian and one Norwegian crate. The only other pair of containers from one country that are a knight’s move apart are the two from Oman.

“5. Either the Australian container or the Chinese one is somewhere above the one from France, not necessarily in the same column.

“6. A diagonal somewhere in the open array of containers, four containers long, extends from one Ecuadorian container to another, with a Welsh container and a Norwegian container in between. And if one of the Danish containers were one container lower, the two Danish crates would be as far apart as the two Ecuadorian ones are.”

Answer: _____



The Trolley Puzzles

Puzzle 4

In another part of the railyard, you see some posts sticking out of the ground in a grid-like pattern. In the square spaces between some of the posts, you see some road cones with numbers on top. You draw a diagram of it in your notebook and ask the old woman about it.

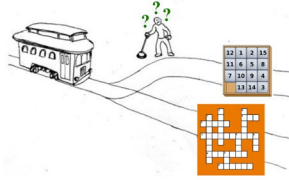
“You and I know that we shouldn’t be here,” she says with a grin, “but we’re safer up here than down there! Those posts form the basis for a fenced-off area within the railyard, to keep people out of the *really* dangerous areas. Management has already mapped out where the fence is meant to go. Soon, some workers will come out and put chain-link fences between some of those posts. They have maps of where to put the fence, naturally; but the road cones with numbers are there to help them double-check. You see, the numbers in the squares indicate the number of sides of the square that should have a fence. The workers all know that the fence never touches or crosses itself, and that it forms a complete loop. So the chance of an error is low. Here...” (she draws some letters in your diagram with a laugh) “... Can you figure out where the fence goes? The letters in squares whose edges touch exactly two links of fence at a 90-degree angle will tell you something!”

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. 2 . 2 . E . 2 . O . 3 . 2 . 1 . N . 2 . 2 .
. 2 . 1 . 3 . 2 . 2 . R . 0 . U . 3 . T . 2 .
. 2 . 0 . S . 1 . I . 2 . A . 3 . I . 2 . L .
. 2 . H . 1 . 2 . O . 3 . L . 1 . 3 . I . 3 .
. T . 2 . D . D . 2 . 2 . 1 . 1 . H . 1 . G .
. O . 2 . A . 2 . 2 . 3 . 3 . E . S . 2 . E .
. 3 . S . 2 . 2 . T . 1 . E . 2 . F . I . 2 .
. O . 1 . D . 3 . L . 1 . T . 3 . T . 2 . 3 .
. 2 . L . 0 . T . 2 . S . 1 . 2 . 1 . 2 . 1 .
. 2 . 2 . S . 2 . 2 . 0 . I . 2 . N . 3 . 1 .

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Answer: _____



The Trolley Puzzles

The Meta-Puzzle, Part I

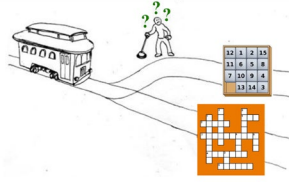
You have thoroughly enjoyed making friends with this unique and interesting person, but your brain feels as though it has had its fill of puzzling for the day. She shakes hands and shows you a shortcut home across the railyard. You climb down the structure the two of you were both standing on, and walk toward the secret exit she has shown you. As you walk, you keep watching a sort of switching area in which the train cars and trolleys become hitched and unhitched.

You find that you can't stop thinking of the world around you as a puzzle. You now imagine all the four secret words you learned by solving the 'trolley puzzles', lined up like trains from shortest to longest, each letter being a different train car. The first one goes straight through the switching yard without any alteration. The second loses its first letter (the train's engine, which is reserved for some other train, you presume). The third answer either has its first letter switch with an A, or its second letter switch with a B, or its third letter switch with a C, and so on. And the fourth answer is replaced by a different word with exactly the opposite meaning. Each of these transformations leaves you with a common English word.

Suddenly, you realize something interesting: all four of these words (the three new ones, plus the one that never switched) can be placed before or after another common English word – the very same word for each of the four – to make a common phrase! Two of the words have the new word going in front, and two have it going in back.

Can you think of the common word that has this property?

Answer: _____



The Trolley Puzzles

The Meta-Puzzle, Part II

Suddenly, you notice that two parents and their three children are cutting across the railyard unsafely. You realize that you're hardly one to talk – you did, after all, ignore the warning sign up above – but these people seem altogether more reckless, especially given that they are leading their children into danger. In fact, they are going right through the most dangerous area, with the road cones and numbers, and are walking the narrow line between two long lengths of fence that have already been put up. As you look behind you, following the track that the family is walking along, you see, to your horror, that a heavy trolley is rushing toward them. There is no time for them to escape the danger. But what can you do? Immediately, you see beside you an emergency switch for stopping anything coming down the track.

In an instant, you realize how the switch works: it swings a very thick and heavy bar onto the railyard, big and sturdy enough to mechanically stop even a trolley like this one from going further when it smashes to the ground. But that bar is... just the place where you and the old woman were just standing! You see her still there, looking through her binoculars.

What should you do?

To know the answer, you will need to know the difference between two things. The words for these two things both appear in common phrases that also use the secret word you discovered in Part I of this Meta-Puzzle. The first phrase means 'following a course likely to succeed'. The second phrase means 'a poor neighborhood', and uses the secret word in the plural.

What must you know? _____