I Had to Call In a Mathematician

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I'd spent the weekend working on an analysis problem. Just before leaving for work on Monday morning, I realized my solution had come unraveled. I quickly tried a few things to fix it but couldn't figure it out. I didn't feel good about leaving it there until I got home that night, so I called the office and said I'd be late. I'd have to call in a mathematician.

She arrived in around twenty minutes and I showed her the problem. I didn't want to interfere, so I left her alone to work on it. I thought I'd better check in with the office.

"Hello, Exeter Plumbing."

"Hi Janice. It's Mort. I've got another problem here and I've had to call in a mathematician. I'm stuck at home until she's done."

"Oh, dear. Not again. Listen, Harry couldn't go to the Wentworth job site because those brass fittings came in but were the wrong size, so we had to reorder them. I sent him to your eight-thirty job at the Oldmans'."

"Okay, I'm glad he was able to cover for me. But they won't be happy at Wentworth. I'm not sure how long it's going to take for the mathematician to finish. Why don't we schedule Ah, it looks like she's got something for me. I'll call you back when I know what's up."

The mathematician came over with a sheet of paper.

"It looks like someone was trying to use a contraction mapping here. That won't work unless the target space is compact."

"Oh, ah, I wonder how that got in there. One of the kids, maybe." She rolled her eyes like I was an idiot.

"I'm not sure if this space is separable. Where did you get it?"

"It sort of seemed like a natural setting for the problem." I was trying not to sound like a fool. We weekend mathematicians can feel a bit put out when a professional starts talking about things we're hazy on.

She rolled her eyes again. "Look, you're going to need a separable Hilbert space."

"Hilbert space? Isn't that going to cost a lot? Wouldn't a Banach space do?"

She adopted the You-are-a-child-and-I-will-explain-it-to-you-slowly voice. "We need a Hilbert space for orthogonality. If it doesn't have a countable dense set this argument isn't going to work."

I was lost over the countable dense stuff but was going to give it one more try. I looked at her hopefully. "What about the contraction mapping method?"

"Do you want to solve the problem or not? If you want to use a contraction mapping, the target space must be compact. In this problem I don't see any reason why it would be compact. So, I'm going to bring in the Hilbert space. It should take about half an hour."

I tried one last time to show I was still in the game. "Does it have to be separable?"

"Maybe not, but it will take a lot longer if it isn't and then this will—"

"—cost more. Okay, go ahead."

I left her to work on it and went into another room to phone my plumbing company again.

"Hi, Janice. Mort again. The mathematician thinks she can solve the problem in half an hour. When is the next call? I've got the truck here so I'll go directly."

The mathematician was true to her word and solved the problem in around 25 minutes. There was a unique solution, just as I had suspected, but she tackled it in a way I never would have thought of. One of the frustrating things about working on mathematics at home is you just don't have access to the specialized tools a professional does. At that point I was glad I hadn't told her I was also trying to solve it with a Fourier transform. Kind of embarrassing.

The final bill was \$375.

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