

1 Interview

1.1 Interview 1

Q1. Your Name - Vino Shankar

Q2. What do you do in your daily life?

Data scientist

Professional Skills- Astrophysics

Q3. What is your highest Qualification?

Doctorate from University of Birmingham, UK

Q4. Generic question about the scientific calculator, can you share your past experience of using a scientific calculator?

Used extensively

Q5. Have you ever dealt with irrational numbers may be in your school, university or work? If yes, can you share any particular concept or project where you used them?

Not used them in my work

Q6. Have you used natural logarithms in any of your previous work or as a school project? If yes, can you share any particular concept or project where you used them?

Yes, used when dealing with visualization of sparse matrix, feature selection for modelling, in verifying the results of regression analysis, etc

Q7. How will you describe the frequency of your usage of natural logarithm?

☐ Rarely used

☒ Frequently used

☐ Somewhat in between Rare and Frequent Usage

Q8. Can you illustrate an example which can demonstrate the fact that using a natural logarithm is helpful- Any real-world application?

When looking at a very large dataset with few repetitive values, plotting them as such will not make much sense. However, when you plot the log values, you will be better able to understand the data and compare the different frequency bins.

Q9. How do you prefer solving an equation involving a natural logarithm?

- ☒ Using a Scientific Calculator
- ☐ Manually
- ☐ Both

Q10. Any challenges you faced while using this number i.e. Natural logarithm with or without a calculator?

Not really

Q11. Have you used the natural logarithm of 2 in any of your previous work or as a school project? If yes, can you share any particular concept or project where you used them?

Not used them much

Q12. How will you describe the frequency of your usage of the natural logarithm of 2- rarely used or frequently used?

- ☒ Rarely used
- ☐ Frequently used
- ☐ Somewhat in between Rare and Frequent Usage

Q13. Can you illustrate an example for me which can demonstrate the fact that using a natural logarithm of 2 is helpful- Any real-world application?

N/a

Q14. When you use the natural logarithm of a number do you round off the digits and if so how many decimal places do you prefer rounding off the result?

Usually 3

Q15. Any feature, one or more, you feel that should be there in the scientific calculator to make it easier for the user to perform complex mathematical equation easily using a natural logarithm of 2?

N/a

Q16. Any challenges you faced while using this number i.e. Natural logarithm of 2 with or without a calculator?

N/a

1.2 Interview 2

Q1. Your Name - Manjit

Q2. What do you do in your daily life?
Teaching, Assistant Professor of Mathematics at Punjabi University.

Q3. What is your highest Qualification?
PhD in Mathematics from Thapar Institute of Engineering and Technology, India.

Q4. Generic question about the scientific calculator, can you share your past experience of using a scientific calculator?
Nothing special, but one thing that I found useful about scientific calculator is use of brackets, using brackets I was used to solve complex fractions carrying several numerical values.

Q5. Have you ever dealt with irrational numbers may be in your school, university or work? If yes, can you share any particular concept or project where you used them?
As I am PhD in Mathematics, so irrational number are quite familiar to me. One thing that first fascinated me about irrational is the proof that $\sqrt{2}$ is irrational which I read in Rudin's book.

Q6. Have you used natural logarithms in any of your previous work or as a school project? If yes, can you share any particular concept or project where you used them?
As I already told I am PhD in mathematics so logarithm was part of daily routine.

Q7. How will you describe the frequency of your usage of natural logarithm?

- ☐ Rarely used
- ☒ Frequently used
- ☐ Somewhat in between Rare and Frequent Usage

Q8. Can you illustrate an example which can demonstrate the fact that using a natural logarithm is helpful- Any real-world application?
Any physical model which involves exponential equation of any sort will definitely lead to application of logarithms.

Q9. How do you prefer solving an equation involving a natural logarithm?

- ☒ Using a Scientific Calculator
- ☐ Manually
- ☐ Both

Q10. Any challenges you faced while using this number i.e. Natural logarithm with or without a calculator?

Hardly.

Q11. Have you used the natural logarithm of 2 in any of your previous work or as a school project? If yes, can you share any particular concept or project where you used them?

Yes

Q12. How will you describe the frequency of your usage of the natural logarithm of 2- rarely used or frequently used?

☐ Rarely used

☐ Frequently used

☒ Somewhat in between Rare and Frequent Usage

Q13. Can you illustrate an example for me which can demonstrate the fact that using a natural logarithm of 2 is helpful- Any real-world application?

In computing compound interest the use of natural logarithm is very prevalent.

Q14. When you use the natural logarithm of a number do you round off the digits and if so how many decimal places do you prefer rounding off the result?

2 decimal places

Q15. Any feature, one or more, you feel that should be there in the scientific calculator to make it easier for the user to perform complex mathematical equation easily using a natural logarithm of 2?

The features in scientific calculators are already self explaining.

Q16. Any challenges you faced while using this number i.e. Natural logarithm of 2 with or without a calculator?

No.

1.3 Interview 3

Q1. Your Name - Nileesha Fernando

Q2. What do you do in your daily life?

Student and working part time as Full Stack PHP intern at PlanetRate, Montreal

Q3. What is your highest Qualification?

Pursuing Master of Software Engineering at Concordia University, Montreal

Q4. Generic question about the scientific calculator, can you share your past experience of using a scientific calculator?

I have used the calculator for educational purposes. In my mathematics and physics classes, it was vital to use the scientific calculator during lab experiments to perform data analysis. I used the Casio S-V P.A.M calculator and

sometimes I used online scientific calculators to perform more complex scientific equations. The main drawback with my current scientific calculator is that it cannot perform complex functionality in a simple manner.

Q5. Have you ever dealt with irrational numbers may be in your school, university or work? If yes, can you share any particular concept or project where you used them?

Yes, in my undergraduate courses - physics and math.

Q6. Have you used natural logarithms in any of your previous work or as a school project? If yes, can you share any particular concept or project where you used them?

I have used natural logarithms in my undergraduate course like - Physics, Math, Machine Learning, Artificial intelligence, Statistics. Also I took Algorithm Design Techniques in my masters. Since all these courses involve computing complex equations hence I have used natural logarithm many times. Not only this, in some hard to solve problems the use of natural logarithm made it easier for me to compute them.

Q7. How will you describe the frequency of your usage of natural logarithm?

- ☐ Rarely used
- ☐ Frequently used
- ☒ Somewhat in between Rare and Frequent Usage

Q8. Can you illustrate an example which can demonstrate the fact that using a natural logarithm is helpful- Any real-world application?

I remember solving problems that involved exponential terms, in my math and algorithm design courses, using natural logarithm manually. In the real world application I can say they can be useful in computing complexity of an algorithm.

Q9. How do you prefer solving an equation involving a natural logarithm?

- ☒ Using a Scientific Calculator
- ☐ Manually
- ☐ Both

Q10. Any challenges you faced while using this number i.e. Natural logarithm with or without a calculator?

None

Q11. Have you used the natural logarithm of 2 in any of your previous work or as a school project? If yes, can you share any particular concept or project where you used them?

Not used

Q12. How will you describe the frequency of your usage of the natural logarithm of 2- rarely used or frequently used?

- ☒ Rarely used
- ☐ Frequently used
- ☐ Somewhat in between Rare and Frequent Usage

Q13. Can you illustrate an example for me which can demonstrate the fact that using a natural logarithm of 2 is helpful- Any real-world application?

Never really used this number in particular but it was a part of complex equation i will compute its value using a scientific calculator.

Q14. When you use the natural logarithm of a number do you round off the digits and if so how many decimal places do you prefer rounding off the result?

3

Q15. Any feature, one or more, you feel that should be there in the scientific calculator to make it easier for the user to perform complex mathematical equation easily using a natural logarithm of 2?

None related to natural logarithm

Q16. Any challenges you faced while using this number i.e. Natural logarithm of 2 with or without a calculator?

None

2 Rationale for selecting the three interviewees

2.1 Reason for choosing Ms. Vino Shankar as interviewee:

She is a Data Scientist and her job profile demands from her to apply analytic skills, knowledge of statistics and programming to fetch data and then analyze it and find interesting pattern out of a large data set. This suggests that she is dealing with complex mathematical equation at work.

2.2 Reason for choosing Mr. Manjit as interviewee :

Mr. Manjit is Mathematics professor, holding a Phd from one of the renowned university in India - Thapar Institute of Engineering and Technology. By interviewing him i was able to collect knowledge from a mathematician.

2.3 Reason for choosing Ms. Nileesha Fernando as interview:

She is currently pursuing her masters degree(Master of Software Engineering) at Concordia University and has successfully completed course - Software Requirement Specification in fall 2018 under professor - Abdelwahab Elnaka with a grade : A+. Additionally, as a side project she created a calculator application using : JavaScript,HTML,CSS. She was able to provide me with the information about the relevance of natural logarithm of 2 in student community of Computer Science/Software Engineering.

3 Analysis of interview :

All three interviewees have used the scientific calculator a lot in computing complex mathematical equations. For the use of irrational numbers it is interesting to note that irrational numbers are not being used by data-scientist professionals in their day to day work. Regarding the use of natural logarithm all three of them have used it extensively i.e. they pointed out its usage in plotting a large data after computing the natural log of the value, in computing complexity of algorithm and any physical model that has an exponential term in it. All the three of them prefer using a scientific calculator to calculate the value of natural logarithm. None of them have dealt with natural logarithm of 2 related problems in particular however Mr. Manjit, mathematician, mentioned about the real world application of this number that it can be used to compute compound interest. They usually prefer rounding off the natural logarithm value to 2 to 3 decimal places when using it in a mathematical equation. It was also noted that none of them feel a need of a change that is required in the scientific calculator for computing natural logarithm of number.