5 group task in calculus for July:

Edited at 7pm 22.7.2018.

1. Explain series convergence tests.

https://en.wikipedia.org/wiki/Convergence\_tests

1.2. Calculate the error of your Euler method for T = 90, K = 9000.

2. What is truncation error?

3. Give the main numerical integration equations.

4. Explain the main integration error bound equations.

5. What is Euler method for numerical solving of differential equations?

https://en.wikipedia.org/wiki/Numerical\_methods\_for\_ordinary\_differential\_equations

6. Explain quaternion.

https://en.wikipedia.org/wiki/Quaternion

7. Solve Jindoh Riddle problem.

http://dishonored.wikia.com/wiki/The\_Jindosh\_Riddle

8. What is Zeta function?

https://en.wikipedia.org/wiki/Riemann\_zeta\_function

9. Explain Bessel function.

https://en.wikipedia.org/wiki/Bessel\_function

10. Give the series convergence tests.

11. Explain the Integral Transforms.

12. Which team showed the most unexpected result in 2018 Soccer World Cup?

https://www.fifa.com/worldcup/matches/?#knockoutphase

13. How many times gravity, electromagnetism, and nuclear forces strengths are different in our Universe? Give the order from the weakest to the strongest.

https://www.quora.com/What-is-the-ratio-between-the-strength-of-strong-nuclear-force-electromagnetic-force-weak-nuclear-force-and-gravitational-force

14. What is the gradient of the Fine Structure Constant alpha in our Universe?

https://www.youtube.com/watch?v=d\_QtkFu6l7Y&t=148s

15. Try to apply for all grants, scholarships, fellowships, etc. in embassies of USA, Canada, Europe, Australia, Japan, etc.

16. Solve the linear and non-linear real projectile problems for A = 89 degrees, V = 89, R = 1/89.

Linear:

x'' + Rx' = 0

y'' + Ry' = -g

Non-linear:

x'' + R(x')2 = 0

y'' + R(y')2 = -g

g = 10

x(t)

y(t)

t = time

x(0) = 0

x'(0) = Vcos(A)

y(0) = 0

y'(0) = Vsin(A)

17. Explain multiple integral.

https://en.wikipedia.org/wiki/Multiple\_integral

18. What is surface integral?

https://en.wikipedia.org/wiki/Surface\_integral

19. Define line integral.

https://en.wikipedia.org/wiki/Line\_integral

Green, Stokes, and Divergence theorems:

20. Explain Green theorem.

https://en.wikipedia.org/wiki/Green%27s\_theorem

21. What is Stokes theorem?

https://en.wikipedia.org/wiki/Stokes%27\_theorem

22. Give Divergence theorem.

https://en.wikipedia.org/wiki/Divergence\_theorem

Quantum computing:

23. Use quantum computer.

https://www.research.ibm.com/ibm-q/

https://en.wikipedia.org/wiki/Quantum\_computing

24. Do least squares exponential regression.

For group task take 9 numbers: from x(1) to x(9) and from y(1) to y(9).

https://calculus12s.weebly.com/uploads/2/5/3/9/25393482/exponentialleastsquaresfit3.txt

http://mathworld.wolfram.com/LeastSquaresFittingExponential.html

https://en.wikipedia.org/wiki/List\_of\_countries\_by\_future\_population\_(United\_Nations,\_low\_fertility\_variant)

25. Do least squares quadratic regression.

https://www.azdhs.gov/documents/preparedness/state-laboratory/lab-licensure-certification/technical-resources/calibration-training/12-quadratic-least-squares-regression-calib.pdf

Deadline is 31.7.2018.