**4 individual task in calculus:**

Edited at 5pm 21.12.2016.

s is your student number. k = s mod 10000. T = s mod 100. m = s mod 35. a = s mod 25.

L = s mod 10. . e = s mod 8. m7 = s mod 7. m6 = s mod 6. m4 = s mod 4. m3 = s mod 3.

**Linear approximation:**

1. Calculate using linear approximation.

**Calculus linked to discrete math:**

2. Find T! and T-th Fibonacci number.

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

https://en.wikipedia.org/wiki/Fibonacci\_number

**Integration:**

3. Calculate

**Numerical integration:**

4. Calculate

**Arc:**

5. Find the arc length of y = x2 at [0, T].

**Continuity of irrational numbers and discontinuity of rational numbers:**

6. Calculate:

a.

b.

= 1 if is a rational number, = 0 if is an irrational number.

= 0 if is a rational number, = 1 if is an irrational number.

**Improper integrals:**

7. Calculate

8. Find

**Inner product:**

9. Calculate the inner product.

We did it in our class on 2 December 2016.

**Exponential growth:**

10. For what x is eLx = 0.5?

We did it in our class on 2 December 2016.

11. For what x is eLx = 0?

12. Two computer companies make computers whose power increases: the first computers increase their power 2T% every two years and the second T% every year. Which computer power grows faster? Why?

We did it in our class on 6 December 2016.

13. What gives the greater value 0.1T% decay in 2 years or 0.05T % every year? Why?

We did it in our class on 6 December 2016.

**Logistic function, Logistic growth, Learning curve:**

14. Calculate logistic function P(t) for i = L+1 and R = t = M = L+2.

We did it in our class on 6 December 2016.

15. Find inflection point of your logistic function for i = L+1 and R = t = M = L+2.

https://www.symbolab.com/solver/function-inflection-points-calculator

https://www.wolframalpha.com/input/?i=inflection+points+e%5Ex%2F(e%5Ex%2B1)

**Series:**

16. Calculate π and hangover for T terms in each of the series.

We did it in our class on 13.12.2016.

**Zimmermann:**

17. Solve Zimmermann Polygonal Areas problem.

http://azspcs.com/Contest/PolygonalAreas

Submit as many different areas solutions as possible in the form (1,2), (2,6), (3,4), (4,5), (6,3), (5,1) going clockwise or anti-clockwise along the border of the polygon for 11, 17, 23, 29, 37, 47, 59, 71, 83, 97, 113, 131, 149, 167, 191, 223, 257, 293, 331, 373, 419, 467, 521. For each problem we need maximum and minimum areas polygons. Do it only if you like it.

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/11polygonal11areas11zimmermann11.txt

**Quantum logic:**

18. Access quantum computer.

http://www.research.ibm.com/quantum/

**Project:**

19. Develop your project into a research paper.

**Deadline: 31.12.2016.**