2 individual calculus task:

Edited at 4pm 24.4.2017.

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.

m2 = s mod 2.

Limits:

1. Calculate a. use L’Hopital’s Rule. b.

Anti-derivative:

2. Find these anti-derivatives.

a. x-T.

b. sin(Tx)

c. cos(Tx)

d. tan(Tx)

3. Calculate: a. i-a b. i-L c. im d. i1/(L+2) e.

f. a – mi + Li – T g. (a – mi)(Ti – L) h. (m – ai)/(Li – T) j. (k – ni)L

p. (a – mi)1/(L+2) q. in u. ik w. iL z. ia

4. Find.

a.

b.

c.

d. (T+im)(a-Li)

e. (T+im)+(a-Li)

f. (T+im)-(a-Li)

Shapes:

5. Classify the shapes. ax2 + mxy + Ly2 = 1 ax2 + my2 + Lz2 + kx + Ty + nz =1

Differential equations:

6. Solve the differential equation. Ty´´ + my´ + Ly = kx.

Series:

7. Check the series convergence using the convergence tests and find the sums.

a.

http://www.wolframalpha.com/widgets/view.jsp?id=86ceba9f35c96ebae137e44a36c7261a

b.

http://www.wolframalpha.com/widgets/view.jsp?id=86ceba9f35c96ebae137e44a36c7261a

c.

https://en.wikipedia.org/wiki/Alternating\_series\_test

d.

8. Expand sin(Tx) in the Taylor Series around 0. Take only terms 0, 1, 2, 3, 4.

Regression:

9. Perform the linear least squares fitting of these points (*L, a*), (*m, k*) and (*T,* ).

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Correlation:

10. Calculate the correlation coefficient for (,L),(a,T),(n,m),(k,m).

Optimization:

Derive the equations, find all the values and give all the ratios for these optimization problems:

11. Given the perimeter P = *T* meters, find the maximum areas of the rectangle, the right angled triangle and any triangle.

Find the sides and the ratios of all sides of the rectangle and the triangles.

12. Given the surface area S = *T* squared meters, find the maximum volume of the cylinder and the cone (with lid and with no lid).

Find R, H and the ratios of R/H for all cases.

13. Solve optimization problem for the cuboid of surface area = T square meters. Maximize the volume.

Deadline: 30.4.2017 Sunday.