MATHEMATICS-1 **Test2-A** **NAME: .....**

25 November 2009

1. (5p)	2. (6p)	3. (9p)	4.(4p)	5. (5p)	6. (6p)	Th. (5p)	Σ (Max 40p)

Corrected by: ……

1. Let be given the points $P_1=(1, 4, -1)$ and $P_2=(2, 6, 4)$
   a.) Find the equation of the line passing through P_1 and P_2 !
   b.) Find the equation of the plane passing through the point $P_0=(0, 1, 3)$ and perpendicular to the vector $\overrightarrow{P_1P_2}$!

2. Find the following integrals: a.) $\int 7x^6 + \frac{3}{\cos^2 x}\,dx$; b.) $\int (3x+1)\cdot\sin(2x)\,dx$;

3. Find the following integrals

   a.) $\int \frac{x+3}{x^2\cdot(x+1)}\,dx$; b.) $\int \frac{e^x}{e^{2x}+6e^x+9}\,dx$ (hint: substitute $t=e^x$)

4. Find the area between $f(x)=\frac{2}{x}$ and $g(x)=x-1$ over the interval [1; 3] !

5. Find the volume of the solid given by the rotation of $f(x)=\frac{\sqrt{\cos x}}{\sin^3 x}$ over $\left[\frac{\pi}{6};\frac{\pi}{4}\right]$ about the *x*-axis!

6. Find the following improper integral: $\int_1^{\infty} \frac{1}{x^2+9x+20}\,dx$

Theoretical question:

Let be the function *f(x)* Riemann integrable on the interval *[a;b]*, and *c* an arbitrary real number.

Show that $\int_a^b c\cdot f(x)\,dx = c\cdot\int_a^b f(x)\,dx$

MATHEMATICS-1 **Test2-B** **NAME: .....**

25 November 2009

1. (5p)	2. (6p)	3. (9p)	4.(4p)	5. (7p)	6. (5p)	Th. (4p)	Σ (Max 40p)

Corrected by: ……

1. Let be given the points $P_1=(0, 2, 1)$, $P_2=(1, 2, 3)$ and $P_3=(1, 6, 2)$
   a.) Find the equation of the plane passing through P_1 , P_2 and P_3 !
   b.) Find the equation of the line passing through the point P_1 and parallell with the normal vector of the plane in the question a.) !

2. Find the following integrals: a.) $\int \cos(2x)+\frac{2}{x^2}\,dx$; b.) $\int (2x+1)\cdot \ln x \;dx$;

3. Find the following integrals
   a.) $\int \frac{7x+1}{(x+3)\cdot(x^2+1)}\,dx$; b.) $\int \frac{1}{\sqrt[4]{x^3}-\sqrt{x}}\,dx$ (hint: substitute $t=\sqrt[4]{x}$)

4. Find the area between $f(x)=\frac{4}{x^2}$ and $g(x)=\frac{x}{2}$ over the interval [1 ; 4] !

5. Find the arc length of the function $f(x)=\frac{x^3}{6}+\frac{1}{2x}$ over the interval [1 ; 3]!

6. Find the following improper integral: $\int_5^9 \frac{1}{\sqrt{x-5}}\,dx$

Theoretical question:

Let be *f(x)* and *g(x)* continuously differentiable functions.

Show that $\int f(x)\cdot g'(x)\,dx = f(x)\cdot g(x)-\int f'(x)\cdot g(x)\,dx$