**Azerbaijan State Oil and Industry University**

**Independent Work**

**Faculty**: ITIF; **Group**: 604.20E; **Specialty**: 050509;

**Subject**: Calculus II

**Student**: Günel Hümbətova \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:

**1**. Find an indefinite integral by making a substitution of the variable

Provide a detailed explanation of the solution process.

Solution:

u = 2x+5

Take the constant out:

Substitute back u=2x+5 :

**2**. Find an indefinite integral by integrating by parts

Provide a detailed explanation of the solution process.

Solution:

**3**. Find an indefinite integral of the rational function

Provide a detailed explanation of the solution process.

Solution:

Sum Rule:

**4**. Determine whether the following improper integral converges or diverges. If it converges, find its value

Solution:

Apply u substitution:

Apply :

Take the constant out:

Use the common integral:

Compute the boundaries : diverges

**5**. Find the area of a region that lies above , to the right of , and under the curve

Solution:

6. Using the Second Fundamental Theorem of Calculus, show that

is continuous on the entire real number line.

Solution:

7. , if is an odd function then proof

Solution:

8.When evaluating

is it appropriate to substitute

to obtain

No.The problem is that over the interval x=[-1;0],x=- .When the square root is used to get from u back to x,the integral effectively divided into 2 integrals:one from -1 to 0 and other from 0 to 1.

9.Deriving a Rule. Show that

Then use this identity to derive the basic integration rule :

Solution:

1 -

10. Finding Constants Determine the constants a and b such that

Use this result to integrate:

Solution:

1 - We’ll use this trigonometric identity: ;

2 - ;

3 - For that to equal sin *x* + cos *x,*

Go back to the one of the first equations to solve for a:

4 -

5 - Proceeding to the integral, make the substitution:

11. Using a series. You delete a finite number of terms from a divergent series. Will the new series still diverge? Explain your reasoning.

Solution:

Yes, the series will still diverge.

Example:

The geometric series

Because the series diverges.

The geometric series

Because the series diverges.

So, and both diverges.

Result:

The divergence of a series is not affected by removal of a finite number of terms from the beginning of the series.

12. Using a series. You add a finite number of terms to a convergent series.

Will the new series still converge? Explain your reasoning.

Solution:

Yes, the series will still converges.

Example:

The geometric series

Because the series converges.

The geometric series

Because the series converges.

So, and both converges.

Result:

Adding a finite number of terms will not change the series' tendency to increase or decrease towards a number.