Limits of Riemann Sums Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Part I.

1. A. Write an integral expression for the area of the region bound by f(x) = 2x and the x-axis over the interval [1,2].

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B. If the interval [1,2] is partitioned into equal subintervals, what is the width of one subinterval?

 ∆x = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C. Find an expression for the right hand endpoint of the ith subinterval.

 xi = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D. Find an expression for f( xi ).

 f( xi )= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E. Write an expression for the ith rectangle.

 f( xi )∆x = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

F. Write a limit expression to represent the area of the region.

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1. Suppose f(x) = 2x is instead partitioned into n subintervals over [3,7].
2. Write an integral expression for the area of the region.

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1. What is the width of one subinterval?

 ∆x = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Find an expression for the right hand endpoint of the ith subinterval.

 xi = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Find an expression for f( xi ).

 f( xi )= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Write an expression for the ith rectangle.

 f( xi )∆x = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Write a limit expression to represent the area of the region.

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Part II. Use the process outlined in Part I to find a limit expression for the area of each region bounded by the given function and the x-axis on [a, b].

**Function, [a, b] Limit expression of the Riemann sum**

1. $f (x) = 3x$on [0, 2] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. $f (x) = x^{2}$ on [0, 3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. $f (x) = 2x^{2}$on [1, 3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.$ f (x) = 1- x^{2}$ on [-1, 1] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. $f (x) = 2x - x^{3}$on [0, 1] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



6.

7.

8.

9.

Part III. In each of the following problems, translate the Riemann sum into a definite integral.



1.

2.

3.

4.