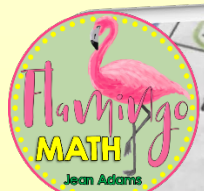


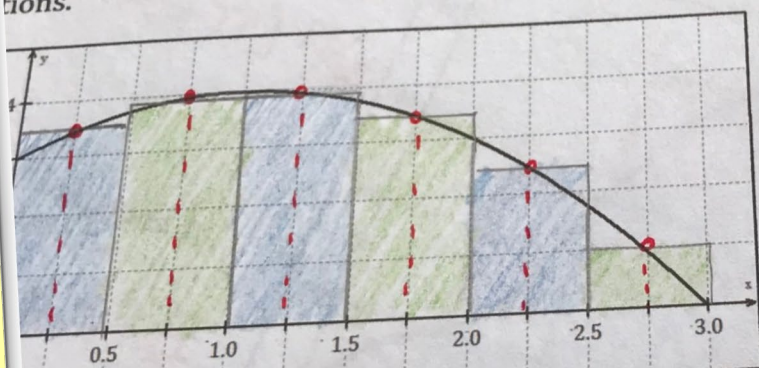
AP[®] Calculus-AB

Integration

Accumulation of Change



of $f(x) = 3 + 2x - x^2$ on the interval $[0, 3]$ using the
tions.



.25	.75	1.25	1.75	2.25	2.75
2.875	3.4375	3.9375	3.375	2.6875	1.9375

Homework

6

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AP CALCULUS AB CURRICULUM

Scope and Sequence

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AP CALCULUS AB CURRICULUM

Scope and Sequence

Unit 6: Integration - Accumulation of Change

Lesson	Skills & Learning Objectives
[6.1] Approximating Area with Riemann Sums	☐ Use Left, Right, and Midpoint Riemann Sums and Trapezoidal Rule to estimate area under a curve
[6.2] Sigma Notation and Riemann Sums	☐ Apply the properties of sequences to write integrals as a limit of right-hand sums.
[6.3] Accumulation Functions	☐ Use FTC to analyze functions, find displacement, total distance, and more.
[6.4] Properties of Definite Integrals	☐ Calculate a definite integral using areas and properties of definite integrals
[6.5] Antiderivatives and Indefinite Integrals	☐ Construct the general anti-derivative of a function through discovery and check approach.
[6.6] The Fundamental Theorem of Calculus	☐ Use the Fundamental Theorem of Calculus to find the definite integral of a function over an interval.
[6.7] Integration by Substitution	☐ Use pattern recognition and change of variables to find indefinite and definite integrals
[6.8] Integrals of Transcendental Functions	☐ Use rules of integration for transcendental functions, including inverse trigonometric rules.

6.I

Approximating Areas with Riemann Sums Homework

Name _____

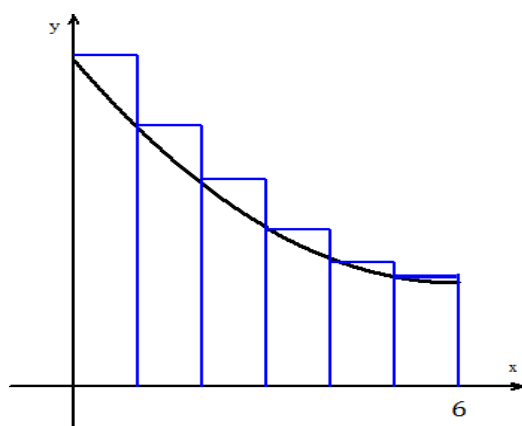
Date _____ Period _____

Problems 1 – 10, Complete the following exercises. Show set up for each approximation.

1. A Riemann sum approximation with n partitions to $\int_a^b f(x)dx$ is shown below.

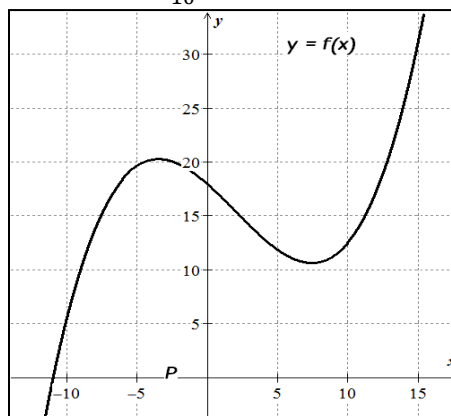
A. Is this a left- or right-hand sum?

B. What are the values of a, b, n , and Δx

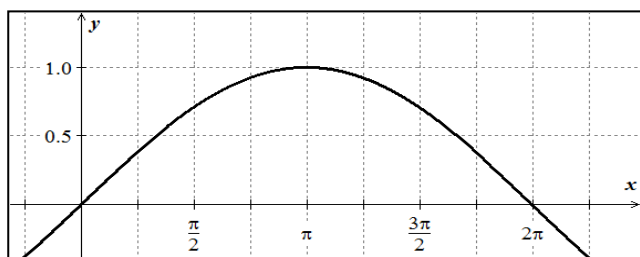


2. Use the graph below to estimate

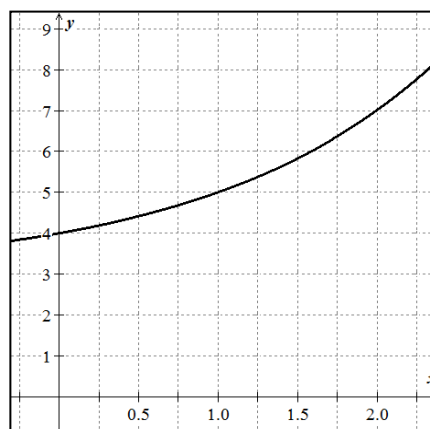
$$\int_{-10}^{15} f(x)dx$$



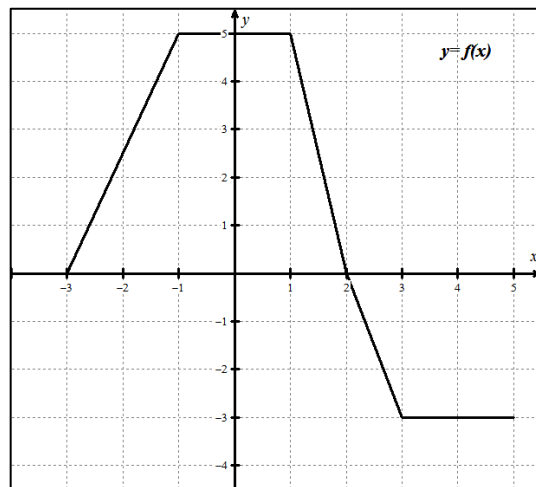
3. Find the area A under the graph of $f(\theta) = \sin\left(\frac{\theta}{2}\right)$ on the interval $[0, 2\pi]$ with $n = 4$ partitions using Midpoint sums.



4. Find the area A under the graph of $f(x) = 2^x + 3$ on the interval $[0, 2]$ with $n = 4$ partitions using the Trapezoidal sum method.



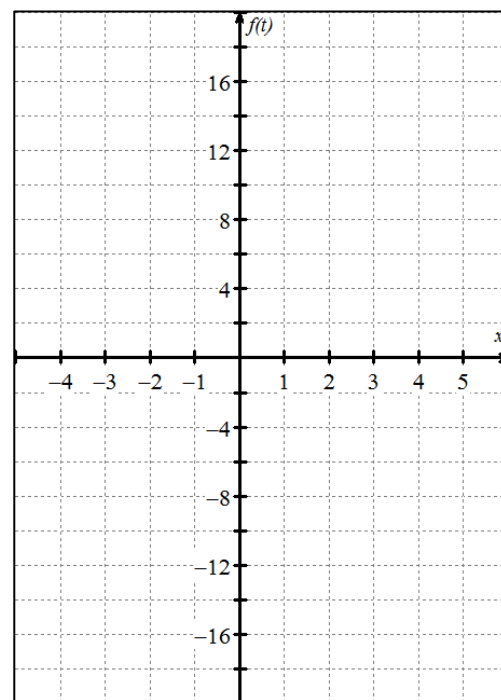
2. Let $F(x)$ be a differentiable function on a closed interval with $F(1) = 13$, whose first derivative $y = f(x)$ is graphed at right. Use the graph of f to complete the table.



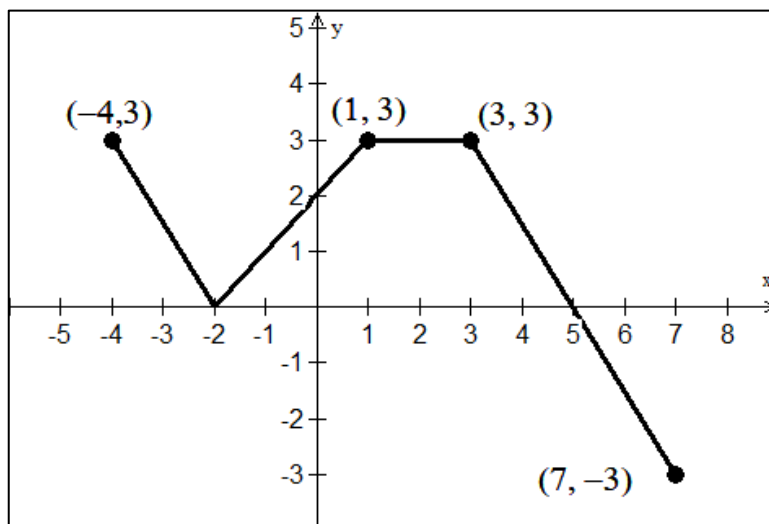
x	-3	0	1	2	3	4	5
$F(x)$			13				

- A. On what interval is f positive? _____
- B. On what interval, is f negative? _____
- C. On what interval is $F(x)$ increasing? _____
- D. On what interval, if any, is $F(x)$ decreasing? _____
- E. For $-3 \leq x \leq 5$, find the value of x at which $F(x)$ has an absolute minimum.
Justify your answer.

- F. Graph $F(x)$ on grid at right.



Problems 11 – 16, Below is the graph of $f(x)$. Use the graph to find the values of each of the following definite integrals.



11. $\int_{-4}^3 f(x) dx$

12. $\int_0^5 f(x) dx$

13. $\int_{-2}^7 f(x) dx$

14. $\int_7^0 f(x) dx$

15. $\int_{-2}^5 f(x) dx$

16. $\int_{-4}^7 f(x) dx$

6.5

Antiderivatives & Indefinite
Integrals Homework

Name _____

Date _____ Period _____

Problems 1 – 14, Find the indefinite integral and check the result by differentiation.

1. $\int (x^3 - 2) dx$

2. $\int (x^{3/2} + 4x + 1) dx$

3. $\int (\sqrt[3]{x^2} - 1) dx$

4. $\int \frac{1}{x^4} dx$

5. $\int \frac{x-3}{\sqrt{x}} dx$

6. $\int (y+3)y^2 dy$

7. $\int 5 dt$

8. $\int (3 \cos x - 2 \sin x) dx$

9. $\int (3 + \sec x \tan x) dx$

10. $\int (\sqrt{x^3} - 2) dx$

11. $\int 5 \sin x - 3e^x dx$

12. $\int (6x^2 + 3e^x) dx$

13. $\int (\tan^2 \theta + 1) d\theta$

14. $\int (\cos x + 5^x) dx$

6.7**Integration by Substitution
Homework**

Name _____

Date _____ Period _____

Problems 1- 10, Find the indefinite integral.

1. $\int x(x^2 - 1)^3 dx$

2. $\int x(2x^2 + 3)^{10} dx$

3. $\int x^2 \sqrt[3]{3x^3 + 7} dx$

4. $\int \frac{x}{\sqrt[3]{1 - 2x^2}} dx$

5. $\int \frac{t - 2}{(t^2 - 4t + 3)^3} dt$

6. $\int 3 \sin(4x) dx$

6.8

Integration of
Transcendental
Functions Homework

Name _____

Date _____ Period _____

Problems 1 -16, Find the indefinite integral for each of the following.

1. $\int 4^{-x} dx$

2. $\int \frac{-2 \sin x}{\cos x} dx$

3. $\int (x^2 + 2^{-x}) dx$

4. $\int \frac{e^{-x}}{1 + e^{-x}} dx$

5. $\int \frac{1}{9 + (x - 1)^2} dx$

6. $\int \frac{x^2 + 3x + 5}{x + 1} dx$

7. $\int \cot \frac{\theta}{2} d\theta$

8. $\int \frac{1}{\cos^2 x \tan x} dx$