

Test 4A Review #1

Name _____

Integrate each indefinite integral.

1. $\int (4x^3 + 3x^2 - 5x + 15)dx$

2. $\int (2x+5)^2 dx$

3. $\int (2x+5)(x+1)dx$

4. $\int (2x^{1/3} + x^{1/5})dx$

5. $\int (\sqrt[6]{x} + \sqrt[5]{x^2})dx$

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

Approximate the area under the curve.

1. Left endpoint
2. Right endpoint
3. Average left and right
4. Trapezoid Rule
5. Integrate

7. $\int_0^2 x^3 dx, n = 4$

8. $\int_1^2 (x^2 + 1)dx, n = 4$

Use the midpoint rule on number 9 and the trapezoid rule on number 10.

9. $\int_1^3 (\ln x) dx$, $n = 5$

10.

x	0	2	4	6	8
y	10	14	16	18	17

11. Let $\int_{-2}^2 3f(x)dx = 12$, $\int_{-2}^5 f(x)dx = 6$ and $\int_{-2}^7 f(x)dx = -2$. Find each.

a. $\int_2^{-2} f(x)dx =$

b. $\int_2^5 (f(x) + 2)dx =$

c. $\int_2^2 (3f(x))^2 dx =$

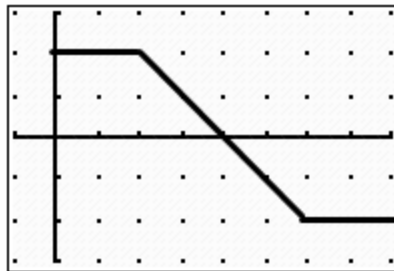
d. $\int_5^7 f(x)dx =$

Find the general solution and particular solution.

12. $\frac{dy}{dx} = 3x - 1$, $(0, 7)$

13. $\frac{dy}{dx} = \sqrt[3]{x}$ $(1, 0)$

14. Given the graph solve each.



a. $\int_0^2 f(x) dx =$

b. $\int_0^4 f(x) dx =$

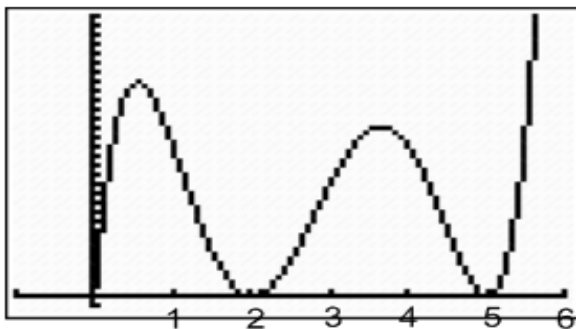
c. $\int_0^6 f(x) dx =$

d. $\int_0^8 f(x) dx =$

e. $\int_0^8 |f(x)| dx =$

f. $\int_0^1 (f(x) + 2) dx =$

15. Let $g(x) = \int_0^x f(t) dt$ where $f(t)$ is the function graphed below. (**Note that the graph of $f(t)$ is shown, not the graph of $g!$**). Use the graph to answer the following questions.



- At $x = 1$ is g increasing or decreasing?
- At $x = 3$ is g concave up or concave down?
- Where does g achieve a global minimum on the interval $[0, 5]$?

16. Find the average value of $f(x) = x^2$ on $[1, 4]$. Show that this average value is the height of a rectangle with base (width) equal to $4 - 1 = 3$ and area equal to the definite integral of f over $[1, 4]$.

17. Let $f(x) = 5x^4 + 2$. Determine c such that $f(c)$ is the average value of f on $[-1, 2]$.

18. Find $f'(x)$ for each.

a. $f(x) = \int_{\sin x}^3 \ln(t) dt$

b. $f(x) = \int_{3x}^{x^3} \ln(t) dt$

19. How is the Mean Value Theorem of Differentiation related to the Mean Value Theorem of Integration?