**BC CALCULUS PRACTICE 6R** **Name:** ______________________________ **Period** ________

Aisle: __________ pg. 437 – 5-37 every other odd, 53-89 every other odd, 91,92,95-103 odds

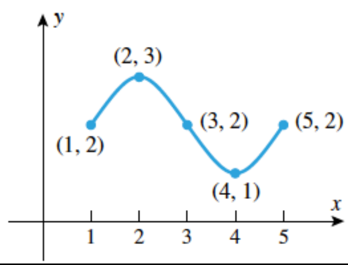
5.
$$\int (4\sin x + 2\cos x)dx$$

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

13. Show that the substitutions $u = \sec x$ and $u = \tan x$ produce different values for the integral. Explain why both are correct.
$$\int sec^2 x \tan x \, dx$$

17.
$$\int \frac{\cos 3x}{\sqrt{5 + 2\sin 3x}} dx$$

25.
The accompanying figure shows five points on the graph of an unknown function $f$. Devise a strategy for using the known points to approximate the area $A$ under the graph of $y = f(x)$ over the interval $[1, 5]$. Describe your strategy, and use it to approximate $A$.




21.
In each part, confirm the stated equality.

(a) $1 \cdot 2 + 2 \cdot 3 + \cdots + n(n+1) = \frac{1}{3}n(n+1)(n+2)$

(b) $\lim_{n \to +\infty} \sum_{k=1}^{n-1} \left(\frac{9}{n} - \frac{k}{n^2}\right) = \frac{17}{2}$

(c) $\sum_{i=1}^{3} \left(\sum_{j=1}^{2} (i+j)\right) = 21$

29. Use a calculating utility to find the left endpoint, right endpoint, and midpoint approximations to the area under the curve over the stated interval using $n = 10$ subintervals.
$y = \ln x$; $[1,2]$

53. Evaluate with the FTC.

$$\int_0^2 |2x-3|\,dx$$

33.

Suppose that

$$\int_0^1 f(x)\,dx = \tfrac{1}{2}, \quad \int_1^2 f(x)\,dx = \tfrac{1}{4},$$

$$\int_0^3 f(x)\,dx = -1, \quad \int_0^1 g(x)\,dx = 2$$

In each part, use this information to evaluate the given integral, if possible. If there is not enough information to evaluate the integral, then say so.

(a) $\int_0^2 f(x)\,dx$ (b) $\int_1^3 f(x)\,dx$ (c) $\int_2^3 5f(x)\,dx$

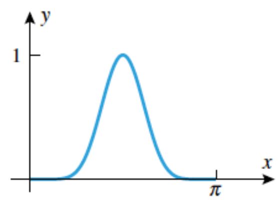
(d) $\int_1^0 g(x)\,dx$ (e) $\int_0^1 g(2x)\,dx$ (f) $\int_0^1 [g(x)]^2\,dx$

37.

One of the numbers $\pi$, $\pi/2$, $35\pi/128$, $1-\pi$ is the correct value of the integral

$$\int_0^\pi \sin^8 x\,dx$$

Use the accompanying graph of $y = \sin^8 x$ and a logical process of elimination to find the correct value. [Do not attempt to evaluate the integral.]




57. Use part 2 of the FTC to find $F'(x)$.

$$F(x) = \int_1^x (t^3+1)\,dt$$

61.

$$\frac{d}{dx}\left[\int_0^x |t-1|\,dt\right]$$

65. State the two parts of the FTC and explain what is meant by the statement “Differentiation and integration are inverse processes.”

69.

In each part, determine the values of $x$ for which $F(x)$ is positive, negative, or zero without performing the integration; explain your reasoning.

(a) $F(x) = \int_1^x \frac{t^4}{t^2+3}\,dt$ (b) $F(x) = \int_{-1}^x \sqrt{4-t^2}\,dt$

73. Derive the formulas for the position and velocity functions of a particle that moves with uniformly accelerated motion along a coordinate line.

77. Find the position function of the particle moving along the s-axis.

$$v(t) = 2t - 3; s(1) = 5$$

81. Find the displacement and the distance traveled by the particle moving along the s-axis during the given time interval.

$$v(t) = \frac{1}{2} - \frac{1}{t^2}; 1 \le t \le 3$$

85. Sketch the curve and find the total area between the curve and the given interval on the x-axis.

$$y = x^2 - 1; [0,3]$$

89. A car traveling 60 mph (88 ft/s) along a straight road decelerates at a constant rate of 10 ft/s$^2$.

(a) How long will it take until the speed is 45 mph?

(b) How far will the car travel before coming to a stop?

95.

$$\int_0^1 \frac{dx}{\sqrt{3x+1}}$$

97.

$$\int_0^1 sin^2\pi x \cos \pi x \, dx$$

99.

$$\int_0^1 \frac{dx}{\sqrt{e^x}}$$