BC CALCULUS PRACTICE 6.5 **Name:** ________________________________ **Period** ________

Aisle: __________ pg. 393 – 3, 5, 7, 9a, 11ac, 13, 15d, 17, 21, 27, 29, 33a, 34

In Exercises 1–4, find the value of

(a) $\sum_{k=1}^{n} f(x_k^*)\Delta x_k$ (b) $\max \Delta x_k$.

3. $f(x) = 4 - x^2;\ a = -3, b = 4;\ n = 4;$
$\Delta x_1 = 1, \Delta x_2 = 2, \Delta x_3 = 1, \Delta x_4 = 3;$

In Exercises 5–8, use the given values of a and b to express the following limits as definite integrals. (Do not evaluate the integrals.)

5. $\lim_{\max \Delta x_k \to 0} \sum_{k=1}^{n} (x_k^*)^2 \Delta x_k;\ a = -1, b = 2$

7. $\lim_{\max \Delta x_k \to 0} \sum_{k=1}^{n} 4x_k^*(1 - 3x_k^*)\Delta x_k;\ a = -3, b = 3$

In Exercises 9 and 10, use Definition 5.5.1 to express the integrals as limits of Riemann sums. Do not try to evaluate the integrals.

9. (a) $\int_1^2 2x\,dx$ (b) $\int_0^1 \frac{x}{x+1}\,dx$

In Exercises 11–14, sketch the region whose signed area is represented by the definite integral, and evaluate the integral using an appropriate formula from geometry, where needed.

11. (a) $\int_0^3 x\,dx$ (c) $\int_{-1}^4 x\,dx$

13. (a) $\int_0^5 2\,dx$ (b) $\int_0^\pi \cos x\,dx$

(c) $\int_{-1}^2 |2x - 3|\,dx$ (d) $\int_{-1}^1 \sqrt{1 - x^2}\,dx$

15d. Given

$$f(x) = \begin{cases} 2x, & x \le 1 \\ 2, & x > 1 \end{cases}$$

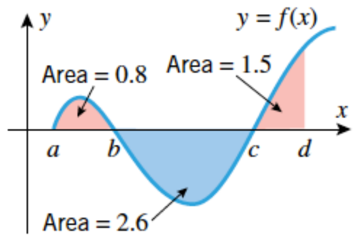
Evaluate $\int_{1/2}^{5} f(x)\,dx$

17.

Use the areas shown in the accompanying figure to find

(a) $\displaystyle\int_a^b f(x)\,dx$ (b) $\displaystyle\int_b^c f(x)\,dx$

(c) $\displaystyle\int_a^c f(x)\,dx$ (d) $\displaystyle\int_a^d f(x)\,dx$.



21.

Find $\displaystyle\int_1^5 f(x)\,dx$ if

$$\int_0^1 f(x)\,dx = -2 \quad \text{and} \quad \int_0^5 f(x)\,dx = 1$$

27. Use Theorem 6.5.6 to determine whether the value of the integral is positive or negative.

(a) $\displaystyle\int_2^3 \frac{\sqrt{x}}{1-x}\,dx$ (b) $\displaystyle\int_0^4 \frac{x^2}{3-\cos x}\,dx$

29. Evaluate the integral by completing the square and applying appropriate formulas from geometry.

$$\int_0^{10} \sqrt{10x - x^2}\,dx$$

33a.

33. Let $f(x) = C$ be a constant function.

(a) Use a formula from geometry to show that

$$\int_a^b f(x)\,dx = C(b-a)$$

34. In each part, use Theorem 6.5.2 and 6.5.8 to determine whether the function f is integrable on the interval $[-1,1]$.

(a) $f(x) = \cos x$

(b) $f(x) = \begin{cases} x/|x|, & x \ne 0 \\ 0, & x = 0 \end{cases}$

(c) $f(x) = \begin{cases} 1/x^2, & x \ne 0 \\ 0, & x = 0 \end{cases}$

(d) $f(x) = \begin{cases} \sin 1/x, & x \ne 0 \\ 0, & x = 0 \end{cases}$