BC CALCULUS PRACTICE 6.4 **Name:** ______________________________ **Period** ________

Aisle: __________ pg. 383 – 12, 15, 19, 22, 23, 25, 31, 33, 55, 59a right, 65, 70

Use Theorem 6.4.2 to evaluate the sums.

12. $\sum_{k=1}^{100}(7k+1)$

15. $\sum_{k=1}^{30} k(k-2)(k+2)$

Evaluate the sums in closed form.

19. $\sum_{k=1}^{n-1} \frac{k^3}{n^2}$

22. Solve the equation $\sum_{k=1}^{n} k = 465$.

In Exercises 23–26, express the function of n in closed form and then find the limit.

23. $\lim_{n \to +\infty} \frac{1+2+3+\cdots+n}{n^2}$

25. $\lim_{n \to +\infty} \sum_{k=1}^{n} \frac{5k}{n^2}$

In Exercises 29–32, divide the interval $[a, b]$ into $n = 4$ subintervals of equal length, and then compute

$$\sum_{k=1}^{4} f(x_k^*)\Delta x$$

with x_k^* as (a) the left endpoint of each subinterval, (b) the midpoint of each subinterval, and (c) the right endpoint of each subinterval.

31.
$f(x) = 3x + 1;\ a = 2, b = 6$

33.
$f(x) = \cos x;\ a = 0, b = \pi$

55. Use Definition 6.4.5 with x_k^* as the right endpoint of each subinterval to find the net signed area between the curve $y = f(x)$ and the specified interval.

$$y = x^2 - 1;\ a = 0, b = 2$$

59.

(a) Show that the area under the graph of $y = x^3$ and over the interval $[0, b]$ is $b^4/4$.

65.

63–66 Consider the sum

$$\sum_{k=1}^{4}[(k+1)^3 - k^3] = [5^3 - 4^3] + [4^3 - 3^3] + [3^3 - 2^3] + [2^3 - 1^3] = 5^3 - 1^3 = 124$$

For convenience, the terms are listed in reverse order. Note how cancellation allows the entire sum to collapse like a telescope. A sum is said to ***telescope*** when part of each term cancels part of an adjacent term, leaving only portions of the first and last terms uncanceled. Evaluate the telescoping sums in these exercises.

$$\sum_{k=2}^{20}\left(\frac{1}{k^2} - \frac{1}{(k-1)^2}\right)$$

70. Let

$$S = \sum_{k=0}^{n} ar^k$$

Show that $S - rS = a - ar^{n+1}$ and hence that

$$\sum_{k=0}^{n} ar^k = \frac{a - ar^{n+1}}{1 - r};\ r \neq 1$$