5.1

Find the value of the indicated sum.

(2) $\sum_{i=1}^{6} i^2 = \frac{n(n+1)(2n+1)}{6}$ where $n=6$

$= \frac{(\cancel{6})(7)(13)}{\cancel{6}} = \boxed{91}$

(4) $\sum_{l=3}^{8} (l+1)^2 = 4^2+5^2+6^2+7^2+8^2+9^2$

$=16+25+36+49+64+81 = \boxed{271}$

(16) Suppose $\sum_{i=1}^{10} a_i = 40$ and $\sum_{i=1}^{10} b_i = 50$

Find $\sum_{i=1}^{10} (3a_n + 2b_n)$

$= \sum_{i=1}^{10} 3a_n + \sum_{i=1}^{10} 2b_n$

$= 3\sum_{i=1}^{10} a_n + 2\sum_{i=1}^{10} b_n$

$= 3(40) + 2(50)$

$= \boxed{220}$

Introduction to Area

5.1

(20) Use special sum formulas to find each sum.

$$\sum_{i=1}^{10} [(i-1)(4i+3)] = \sum_{i=1}^{10} (4i^2 - i - 3)$$

$$= 4\sum_{i=1}^{10} i^2 - \sum_{i=1}^{10} i - \sum_{i=1}^{10} 3$$

$$= 4 \cdot \frac{n(n+1)(2n+1)}{6} - \frac{n(n+1)}{2} - 3 \cdot n \qquad n = 10$$

$$= \frac{\cancel{4}^{2} \cdot 10 \cdot 11 \cdot \cancel{21}^{7}}{\cancel{6}_{\cancel{3}}} - \frac{10 \cdot 11}{2} - 30$$

$$1540 - 55 - 30$$

$$= \boxed{1455}$$

5.1

(23) Use special sum formulas to find the sum

$$\sum_{i=1}^{n} (2i^2 - 3i + 1)$$

$$= 2\sum_{i=1}^{n} i^2 - 3\sum_{i=1}^{n} i + \sum_{i=1}^{n} 1$$

$$= 2 \cdot \frac{n(n+1)(2n+1)}{6} - 3 \cdot \frac{n(n+1)}{2} + 1 \cdot n$$

$$= \frac{2n(n+1)(2n+1)}{6} - \frac{3n(n+1)}{2} \cdot \frac{3}{3} + n \cdot \frac{6}{6}$$

$$= \frac{2n(n+1)(2n+1)}{6} - \frac{9n^2+9n}{6} + \frac{6n}{6}$$

$$= \frac{(2n^2+2n)(2n+1) - 9n^2 - 9n + 6n}{6}$$

$$= \frac{4n^3 + 6n^2 + 2n - 9n^2 - 3n}{6}$$

$$= \frac{4n^3 - 3n^2 - n}{6}$$