EXERCISE 6.4

1. Using differentials, find the approximate value of each of the following up to 3 places of decimal.

   (i) $\sqrt{25.3}$ (ii) $\sqrt{49.5}$ (iii) $\sqrt{0.6}$

   (iv) $(0.009)^{\frac{1}{3}}$ (v) $(0.999)^{\frac{1}{10}}$ (vi) $(15)^{\frac{1}{4}}$

   (vii) $(26)^{\frac{1}{3}}$ (viii) $(255)^{\frac{1}{4}}$ (ix) $(82)^{\frac{1}{4}}$

   (x) $(401)^{\frac{1}{2}}$ (xi) $(0.0037)^{\frac{1}{2}}$ (xii) $(26.57)^{\frac{1}{3}}$

   (xiii) $(81.5)^{\frac{1}{4}}$ (xiv) $(3.968)^{\frac{3}{2}}$ (xv) $(32.15)^{\frac{1}{5}}$

2. Find the approximate value of $f(2.01)$, where $f(x) = 4x^2 + 5x + 2$.
3. Find the approximate value of $f(5.001)$, where $f(x) = x^3 - 7x^2 + 15$.
4. Find the approximate change in the volume V of a cube of side x metres caused by increasing the side by 1%.
5. Find the approximate change in the surface area of a cube of side x metres caused by decreasing the side by 1%.
6. If the radius of a sphere is measured as 7 m with an error of 0.02 m, then find the approximate error in calculating its volume.
7. If the radius of a sphere is measured as 9 m with an error of 0.03 m, then find the approximate error in calculating its surface area.
8. If $f(x) = 3x^2 + 15x + 5$, then the approximate value of $f(3.02)$ is

   (A) 47.66 (B) 57.66 (C) 67.66 (D) 77.66

9. The approximate change in the volume of a cube of side x metres caused by increasing the side by 3% is

   (A) 0.06 x^3 m^3 (B) 0.6 x^3 m^3 (C) 0.09 x^3 m^3 (D) 0.9 x^3 m^3

6.6 Maxima and Minima

In this section, we will use the concept of derivatives to calculate the maximum or minimum values of various functions. In fact, we will find the 'turning points' of the graph of a function and thus find points at which the graph reaches its highest (or