Cube Surface Area Problems

Keys for Similar Questions

1. **Solution for Example 1:**
   - Given: $\frac{dV}{dt} = 12$ cm^3/sec, $x = 10$ cm.
   - $\frac{dx}{dt} = \frac{12}{3 \cdot 10^2} = \frac{12}{300} = \frac{1}{25}$ cm/sec.
   - $\frac{ds}{dt} = 12 \cdot 10 \cdot \frac{1}{25} = \frac{120}{25} = 4.8$ cm^2/sec.
2. **Solution for Example 2:**
   - Given: $\frac{dV}{dt} = 15$ cm^3/sec, $x = 8$ cm.
   - $\frac{dx}{dt} = \frac{15}{3 \cdot 8^2} = \frac{15}{192} = \frac{5}{64}$ cm/sec.
   - $\frac{ds}{dt} = 12 \cdot 8 \cdot \frac{5}{64} = \frac{960}{64} = 15$ cm^2/sec.
3. **Solution for Example 3:**
   - Given: $\frac{dV}{dt} = 20$ cm^3/sec, $x = 12$ cm.
   - $\frac{dx}{dt} = \frac{20}{3 \cdot 12^2} = \frac{20}{432} = \frac{5}{108}$ cm/sec.
   - $\frac{ds}{dt} = 12 \cdot 12 \cdot \frac{5}{108} = \frac{720}{108} = 6.67$ cm^2/sec.
4. **Solution for Example 4:**
   - Given: $\frac{dV}{dt} = 5$ cm^3/sec, $x = 6$ cm.
   - $\frac{dx}{dt} = \frac{5}{3 \cdot 6^2} = \frac{5}{108}$ cm/sec.
   - $\frac{ds}{dt} = 12 \cdot 6 \cdot \frac{5}{108} = \frac{360}{108} = 3.33$ cm^2/sec.
5. **Solution for Example 5:**
   - Given: $\frac{dV}{dt} = 8$ cm^3/sec, $x = 9$ cm.
   - $\frac{dx}{dt} = \frac{8}{3 \cdot 9^2} = \frac{8}{243}$ cm/sec.
   - $\frac{ds}{dt} = 12 \cdot 9 \cdot \frac{8}{243} = \frac{864}{243} = 3.56$ cm^2/sec.
6. **Solution for Example 6:**
   - Given: $\frac{dV}{dt} = 18$ cm^3/sec, $x = 7$ cm.
   - $\frac{dx}{dt} = \frac{18}{3 \cdot 7^2} = \frac{18}{147} = \frac{6}{49}$ cm/sec.
   - $\frac{ds}{dt} = 12 \cdot 7 \cdot \frac{6}{49} = \frac{504}{49} = 10.29$ cm^2/sec.