1. A space vehicle accelerates uniformly from 65 m/s at \( t = 0 \) to 162 m/s at \( t = 10.0 \). How far did it move between \( t = 2.0 \) s and \( t = 6.0 \) s?

\[
\frac{v_f - v_0}{\Delta t} = a = \frac{(162 - 65) \text{m/s}}{10 \text{ s}} = 9.7 \text{ m/s}^2
\]

\[
x = x_0 + v_0 t + \frac{1}{2} a t^2
\]

\[
x(t = 2s) = 65 \text{ m/s}(2s) + \frac{1}{2}(9.7 \text{ m/s}^2)(2s)^2 = 149.4 \text{ m}
\]

\[
x(t = 6s) = 65 \text{ m/s}(6s) + \frac{1}{2}(9.7 \text{ m/s}^2)(6s)^2 = 564.6 \text{ m}
\]

\[
\Delta x = x(6s) - x(2s) = 564.6 \text{ m} - 149.4 \text{ m} = 415.2 \text{ m}
\]

2. A ballplayer catches a ball 3.4 s after throwing it vertically upward. With what speed did he throw it, and what height did it reach?

\[
t = 3.4 \text{ s} \\
\]

\[
v_f = v_0 + at \\
\]

\[
v_f = v_0 + at \\
0 = v_0 (3.4s) + \frac{1}{2}(-9.8 \text{ m/s}^2)(3.4s)^2 \\
\]

\[
v_0 = 17 \text{ m/s}
\]

\[
h = \frac{(17 \text{ m/s})^2 + 2(-9.8 \text{ m/s}^2)h}{1}
\]

\[
h = 15 \text{ m}
\]