

Partial solutions for 3 4 15 23

3. $r(t) = \langle -\frac{1}{2}t^2, t \rangle$, $v(t) = \langle -t, 1 \rangle$, $a(t) = \langle -1, 0 \rangle$, $|v(t)| = \sqrt{t^2 + 1}$

4. $r(t) = \langle t^2, 1/t^2 \rangle$, $v(t) = \langle 2t, -2/t^3 \rangle$, $a(t) = \langle 2, 6/t^4 \rangle$, $|v(t)| = \sqrt{4t^2 + 4/t^6}$

15. $r(t) = (t^2 + 3t)\mathbf{i} + (1 - t)\mathbf{j} + (\frac{1}{3}t^3 + 1)\mathbf{k}$

23. $r(t) = 100t\mathbf{i} + (100\sqrt{3}t - 4.9t^2)\mathbf{j}$. Hits the ground at 35.3 seconds. Travels horizontally 3535 meters. Max height of 1531 meters at 17.7 seconds. Velocity at impact is 200 m/s.