Solutions

2.1

- $2t^2 - 8t + 6 = 0$ gives $t = 1$ and $t = 3$; $u(0) = 6$ m/s.
- Positive on (0,1) and (3,4); negative on (1,3).

2.2

- $U(t) = \tfrac{2}{3}t^3 - 4t^2 + 6t$: $U(1) = 2.667$, $U(3) = 0$, $U(4) = 2.667$ m.
- Displacement $= 2.667$ m; distance $= 2.667 + 2.667 + 2.667 = 8.000$ m.

2.3

- $a = 4t - 8$, zero at $t = 2$ s.

2.4

- $\pi \int_0^3 (9x^2 - 6x^3 + x^4)dx = \pi(81 - 121.5 + 48.6) = \pi \times 8.1 = 25.45$ m3.
- Check: numeric quadrature agrees to two decimals (or shell agreement about the stated axis).

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