

4)

$\operatorname{arcosh} 4x$

$$u = 4x$$

$$u = \frac{1}{\sqrt{(4x)^2 - 1}}$$

$$u = \frac{4}{\sqrt{16x^2 - 1}}$$

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5)

$$S = 2t^3 - 13t^2 + 24t + 10$$

$$v = \frac{dx}{dt} = 6t^2 - 26t + 24$$

$$\text{so } t = 0 \text{ and } v = 10\text{ms}^{-1}$$

$$A = \frac{dv}{dt} = \frac{d^2x}{dt^2} = 12t - 26$$

$$\text{so } t = 0 \text{ and } a = -26\text{ms}^{-2}$$

5a)

$$t = 4\text{s}$$

$$v = (6 \times 4) - (26 \times 4) + (24 \times 4) = 16\text{ms}^{-1}$$

$$a = (12 \times 4) - (26) = 22\text{ms}^{-2}$$

5b)

$$v = 6t^2 - 26t + 24$$

$$t = \frac{26 \pm \sqrt{-26^2 + 4 \times 6 \times 24}}{2 \times 6}$$

$$= \frac{64 \pm \sqrt{100}}{12} = \frac{64 \pm 10}{12}$$

$$+ = \frac{37}{6} \text{ and } - = \frac{9}{2}$$

5c)

$$a = 10^{-2}$$

$$10^{-2} = 12t - 26$$

$$\frac{10 + 26}{12} = t = 3\text{s}$$

5di)

$$a = 5^{-2}$$

$$5^{-2} = 12t - 26$$

$$\frac{5 + 26}{12} = t = 2.6\text{s}$$

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