4)

$$\text{arcosh}4x$$

$$u = 4x$$

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

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

5)

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

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

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

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

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

5a)

$$t = 4s$$

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

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

5b)

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

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

$$= \frac{64 \pm \sqrt{100}}{122} = \frac{64 \pm}{12}$$

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

5c)

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

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

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

5di)

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

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

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