PROB. 11.1

$$X = 1.5t^4 - 30t^2 + 5t + 10 \quad (X \text{ in } m, \ t \text{ in } s)$$

FIND X, v AND a WHEN $t = 4^s$

$$X(t = 4^s) = 1.5(4^s)^4 - 30(4)^2 + 5(4) + 10 \boxed{= -66^{\,m}}$$

$$v = \frac{dx}{dt} = 1.5(4t^3) - 30(2t) + 5 = 6t^3 - 60t + 5$$

$$v(t = 4^s) = 6(4)^3 - 60(4) + 5 \boxed{= 149 \frac{m}{s}}$$

$$a = \frac{dv}{dt} = 6(3t^2) - 60 = 18t^2 - 60$$

$$a(t = 4^s) = 18(4)^2 - 60 \boxed{= 228 \frac{m}{s^2}}$$