11 A particle P moves in a straight line such that, t seconds after passing through a fixed point O, its displacement, s metres, is given by $s = \dfrac{(2t+1)^{\frac{3}{2}}}{t+1} - 1$.

(a) Show that the velocity of P at time t can be written in the form $\dfrac{(2t+1)^{\frac{1}{2}}}{(t+1)^2}(a+bt)$, where a and b are integers to be found. [5]

(b) Show that P is never at instantaneous rest after passing through O. [1]

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12 The first three terms, in descending powers of x, of the expansion of $\left(ax+\frac{2}{5}\right)^5\left(1-\frac{b}{x}\right)^2$, can be written as $32x^5-160x^4+cx^3$, where a, b and c are constants. Find the exact values of a, b and c. [9]

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