

(1) [6] The equation of motion of a particle is  $s(t) = t^3 - 3t$ , where  $s$  is in meters and  $t$  is in seconds. Determine the acceleration of the particle when the velocity is zero.

(2) [3] Differentiate

$$f(x) = x - 3 \sin x$$

(3) [3] Differentiate

$$y = \frac{r^2}{1 + \sqrt{r}}$$

(4) [3] Differentiate

$$y = t^3 \cos t$$