Problem Set 11: Higher Order Derivatives

Find the second derivative of the function.

1. $y = x^3 + 4x^2 - 16x + \frac{1}{2}$

2. $y = \frac{1}{x^2}$

3. $y = 3x + 1$

4. $y = \sqrt{6x}$

5. $y = \sqrt{x}\left(3x^2 - \frac{1}{2}\right)$

6. $y = \frac{3+x^2}{x}$

7. $y = (2x + 6)^3$

Given the position function, find the acceleration at the following time.

8. $x(t) = t^2 - 5$ at $t = 3s$

9. $x(t) = \frac{5}{2}t^{3/4}$ at $t = 1s$

10. The position of a particle is given by $x(t) = t^3 - t + 2$. When is the acceleration of the particle 18?

11. The position of a particle is given by $x(t) = (3t^2 - 2)(2t - 12)$. When is the acceleration of the particle 0?