#s 1 – 10: Differentiate the following with respect to the main variable.

1. $f(x) = 2^{40}$
2. $f(t) = 2 - \frac{2}{3}t$
3. $f(x) = x^3 - 4x + 6$
4. $g(x) = x^2(1 - 2x)$
5. $g(t) = 2t^{-3/4}$
6. $A(s) = -\frac{12}{s^5}$
7. $S(p) = \sqrt{p} - p$
8. $R(a) = (3a + 1)^2$
9. $y = \frac{x^2 + 4x + 3}{\sqrt{x}}$
10. $H(x) = \left(x + x^{-1}\right)^3$

11. Find $\frac{d}{dx}\left[\left(1 + 2x^2\right)\left(x - x^2\right)\right]$ in two ways:

    i. Product Rule

    ii. Expand before differentiating and just use the power rule, term by term.

#s 12 - 17: Differentiate.

12. $V(x) = \left(2x^3 + 3\right)\left(x^4 - 2x\right)$
13. $F(y) = \left(\frac{1}{y^2} - \frac{1}{y^4}\right)\left(y + 5y^3\right)$
14. $g(x) = \frac{1 + 2x}{3 - 4x}$
15. $y = \frac{x^3}{1 - x^2}$
16. $y = \frac{v^3 - 2v\sqrt{v}}{v}$
17. $y = \frac{t^2 + 2}{t^4 - 3t^2 + 1}$