

1. (1)  $\frac{dy}{dx} = 144x^7(9x^8 + 2)$   
(2)  $-\frac{33}{(9 - 8x)^2}$   
(3)  $72z^3 + 54z^2 - 63$   
(4)  $\frac{20t^2 + 162t - 45}{(-9t^2 + 5t)^2}$   
(5)  $\frac{20z^2 + 8z + 15}{(-1 - 5z)^2}$
2. (1)  $\frac{dy}{dx} = -\frac{48(3x^{-8} + 6)}{x^9}$   
(2)  $-\frac{90}{(-9z - 6)^2}$   
(3)  $-24t^3 + 108t^2 - 5$   
(4)  $\frac{-67z^2}{(7z^2 + 6z)^2}$   
(5)  $\frac{-83z^2 - 66z - 12}{(-7z^2 + 5z + 3)^2}$
3. (1)  $\frac{dy}{dx} = -72x^3(-7 - 9x^4)$   
(2)  $-\frac{2}{(-5x + 1)^2}$   
(3)  $-12h^3 - 15h^2 + 6h + 5$   
(4)  $\frac{-35x^2 + 28x + 10}{(7x^2 + 2)^2}$   
(5)  $\frac{114r^2 - 18r - 6}{(-9r^2 - 6r)^2}$
4. (1)  $\frac{dy}{dx} = -\frac{9}{x^4(9 - x^{-3})^4}$   
(2)  $\frac{29}{(8 - t)^2}$   
(3)  $80h^4 - 32h^3 - 12h^2 + 4h$   
(4)  $\frac{46h}{(4h^2 + 5)^2}$   
(5)  $\frac{-12r^2 + 36r - 5}{(r + 6r^2 - 4)^2}$
5. (1)  $\frac{dy}{dx} = -120x^5(-4x^6 - 3)^4$   
(2)  $-\frac{41}{(7 + 9r)^2}$

(3)  $-150r^4 + 138r^2 - 8$

(4)  $\frac{5t^2 - 48t + 20}{(-t^2 + 4)^2}$

(5)  $\frac{-98t^2 - 54t - 13}{(-8t + 6t^2 - 3)^2}$