

p. 181 (3-32) all

3. $f(x) = 2^{40}$

$f'(x) = 0$

4. $f(x) = e^5$

$f'(x) = 0$

5. $f(t) = 2 - \frac{2}{3}t$

$f'(t) = -\frac{2}{3}$

6. $F(x) = \frac{3}{4}x^3$

$F'(x) = 6x^2$

7. $f(x) = x^3 - 4x + 6$

$\frac{df}{dx} = 3x^2 - 4$

8. $f(t) = 1.4t^5 - 2.5t^2 + 6.7$

$f'(t) = 7t^4 - 5t$

9. $g(x) = x^2(1-2x) = x^2 - 2x^3$

$g'(x) = 2x - 6x^2$

10. $h(x) = (x-2)(2x+3) = 2x^2 - x - 6$

$\frac{dh}{dx} = 4x - 1$

11. $g(t) = 2t^{-3/4}$

$\frac{dg}{dt} = -\frac{6}{4}t^{-7/4} = -\frac{3}{2}t^{-7/4}$

12. $B(y) = cy^{-6}$

$\frac{dB}{dy} = -6cy^{-7}$

$$13. A(s) = \frac{-12}{s^5} = -12s^{-5}$$

$$\frac{dA}{ds} = 60s^{-6}$$

$$14. y = x^{5/3} - x^{2/3}$$

$$\frac{dy}{dx} = \frac{5}{3}x^{2/3} - \frac{2}{3}x^{-1/3}$$

$$15. R(a) = (3a+1)^2 = 9a^2 + 6a + 1$$

$$\frac{dR}{da} = 18a + 6$$

$$16. h(t) = \sqrt[4]{t} - 4e^t = t^{1/4} - 4e^t$$

$$\frac{dh}{dt} = \frac{1}{4}t^{-3/4} - 4e^t$$

$$17. S(p) = \sqrt{p} - p = p^{1/2} - p$$

$$\frac{dS}{dp} = \frac{1}{2}p^{-1/2} - 1$$

$$18. y = \sqrt{x}(x-1) = x^{1/2}(x-1) = x^{3/2} - x^{1/2}$$

$$y' = \frac{3}{2}x^{1/2} - \frac{1}{2}x^{-1/2}$$

$$19a. y = 3e^x + \frac{4}{\sqrt[3]{x}} = 3e^x + 4x^{-1/3}$$

$$\frac{dy}{dx} = 3e^x - \frac{4}{3}x^{-4/3}$$

$$20. S(R) = 4\pi R^2$$

$$\frac{dS}{dR} = 8\pi R$$

$$21. h(u) = Au^3 + Bu^3 + Cu$$

$$\frac{dh}{du} = 3Au^2 + 3Bu^2 + C$$

$$22. y = \frac{\sqrt{x} + x}{x^2} = \frac{x^{1/2} + x}{x^2} = \frac{x^{1/2}}{x^2} + \frac{x}{x^2} = x^{-3/2} + x^{-1}$$

$$y' = -\frac{3}{2}x^{-5/2} - x^{-2}$$

$$23. y = \frac{x^2 + 4x + 3}{\sqrt{x}} = \frac{x^2}{x^{1/2}} + \frac{4x}{x^{1/2}} + \frac{3}{x^{1/2}} = x^{3/2} + 4x^{1/2} + 3x^{-1/2}$$

$$\frac{dy}{dx} = \frac{3}{2}x^{1/2} + 2x^{-1/2} - \frac{3}{2}x^{-3/2}$$

$$24. g(u) = \sqrt{2}u + \sqrt{3}u = \sqrt{2}u + \sqrt{3} \cdot \sqrt{u} = \sqrt{2}u + \sqrt{3}u^{1/2}$$

$$\frac{dg}{du} = \sqrt{2} + \frac{\sqrt{3}}{2}u^{-1/2}$$

$$25. j(x) = x^{2.4} + e^{2.4}$$

$$\frac{dj}{dx} = 2.4x^{1.4}$$

$$26. k(r) = e^r + r^e$$

$$\frac{dk}{dr} = e^r + e r^{e-1}$$

$$27. H(x) = (x + x^{-1})^3 = (x + \frac{1}{x})(x + \frac{1}{x})(x + \frac{1}{x}) = (x^2 + 2 + \frac{1}{x^2})(x + \frac{1}{x})$$

$$= x^3 + 2x + \frac{1}{x} + x + \frac{2}{x} + \frac{1}{x^3} = x^3 + 3x + \frac{3}{x} + \frac{1}{x^3}$$

$$\frac{dH}{dx} = 3x^2 + 3 - 3x^{-2} - 3x^{-4}$$

$$28. y = ae^v + \frac{b}{v} + \frac{c}{v^2} = ae^v + bv^{-1} + cv^{-2}$$

$$y' = ae^v - bv^{-2} - 2cv^{-3}$$

$$29. u = \sqrt[5]{t} + 4\sqrt{t} = t^{1/5} + 4t^{1/2}$$

$$\frac{du}{dt} = \frac{1}{5}t^{-4/5} + 10t^{-1/2}$$

$$\begin{aligned} 30. \quad v &= \left(\sqrt{x} + \frac{1}{3\sqrt{x}} \right)^2 = (x^{1/2} + x^{-1/3})(x^{1/2} + x^{-1/3}) \\ &= x + x^{1/6} + x^{1/6} + x^{-2/3} = x + 2x^{1/6} + x^{-2/3} \end{aligned}$$

$$\frac{dv}{dx} = 1 + \frac{1}{3}x^{-5/6} - \frac{2}{3}x^{-5/3}$$

$$31. \quad z = \frac{A}{y^{10}} + Be^y = Ay^{-10} + Be^y$$

$$\frac{dz}{dy} = -10Ay^{-11} + Be^y$$

$$32. \quad y = e^{x+1} + 1$$

$$y' = e^{x+1}$$