3.1

(12). $y = 5e^x + 3$. $y' = 5e^x$

(16). $B(y) = c y^{-6}$ $B'(y) = -6c y^{-7}$

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

(28). $y = ae^v + \frac{b}{v} + \frac{c}{v^2}$ $y' = ae^v - bv^{-2} - 2cv^{-3} = ae^v - \frac{b}{v^2} - \frac{2c}{v^3}$

(40). $f(x) = 3x^5 - 20x^3 + 50x$ $f' = 15x^4 - 60x^2 + 50$

(44). (b) f' is zero at $x_1 \approx 0.2$, $x_2 \approx 2.8$

the slopes are positive on $(-\infty, x_1)$ and (x_2, ∞) $(f' > 0)$

the slopes are negative on (x_1, x_2) $(f' < 0)$

(c). $g(x) = e^x - 3x^2$ $g'(x) = e^x - 6x$.

3.2 (4). $y' = x^{\frac{1}{2}}e^x + \frac{1}{2}e^x x^{-\frac{1}{2}}$

(6). $y' = \frac{xe^x}{(x+1)^2}$

(14). $y' = \frac{-2x^3 - 3x^2 - 3}{(x^3 + x - 2)^2}$

(20). $z' = \frac{5}{2}w^{3/2} + \frac{1}{2}c\,w^{1/2}e^w(2w+3)$

(26). $f'(x) = \frac{ad - bc}{(cx+d)^2}$

(40). (a). $f'(x) = \frac{1 - x^2}{x^4 + 2x^2 + 1}$ $f'' = \frac{2x(x^2 - 3)}{(x^2+1)^3}$

3.3 ④ $y' = -2\csc x \cot x - 5\sin x$

⑥ $y' = e^u(\cos u - \sin u + cu + c)$

⑫ $y' = \dfrac{\sec x(1-\sec x)}{\tan^2 x}$

⑭ $y' = -\csc\theta\cot\theta(\theta + 2\cot\theta)$

⑯ $f(x) = x^2\sin x\tan x \qquad f'(x) = x\sin x(2\tan x + x + x\sec^2 x)$

3.4 ② $u = g(x) = 4+5x \qquad \dfrac{dy}{dx} = \dfrac{dy}{du}\cdot\dfrac{du}{dx} = \dfrac{3}{2\sqrt{4+5x}}$

⑧ $F'(x) = 100(4x-x^2)^{99}(4-2x)$

⑩ $f'(x) = \dfrac{8x^3}{3(1+x^4)^{\frac{1}{3}}}$

⑫ $f'(t) = \dfrac{\sec^2 t}{3\sqrt[3]{(1+\tan t)^2}}$

⑭ $y' = -3\sin x\cos^2 x$

㉒ $y' = -e^{-5x}(3\sin 3x + 5\cos 3x)$

㉔ $y' = -2x(\ln 10)\,10^{1-x^2}$

㉖ $G'(y) = \dfrac{2(y-1)^3(-3y^2+4y+5)}{(y^2+2y)^6}$

㉙ $y' = 2\cos(\tan 2x)\sec^2(2x)$

(30). $G'(y) = \dfrac{5y^9(y+2)}{(y+1)^6}$

(38). $y' = \dfrac{k\sec^2\sqrt{x}}{2\sqrt{x}}\, e^{k\tan\sqrt{x}}$

(42). $y' = \frac{1}{2}\left(x+\sqrt{x+\sqrt{x}}\right)^{-\frac{1}{2}}\left(1+\frac{1}{2}(x+\sqrt{x})^{-\frac{1}{2}}\left(1+\frac{1}{2\sqrt{x}}\right)\right)$

(44). $y' = 2^{3^{x^2}}\cdot(\ln 2)\cdot 3^{x^2}\cdot(\ln 3)\cdot 2x$

3.5 (5). $y' = -\dfrac{x^2}{y^2}$ (6). $y' = -\dfrac{2\sqrt{y}}{\sqrt{x}}$

(10). $y' = \dfrac{2xy(e^{x^2}-y^2)}{5y^4+3x^2y^2-e^{x^2}}$ (12). $y' = \dfrac{1-y^2\cos(xy^2)}{2xy\cos(xy^2)}$

(18). $y' = \dfrac{(1+x^2)\sec^2(x-y)+2x\tan(x-y)}{1+(1+x^2)\sec^2(x-y)}$ (22). $g'(0)=0$.

(32). (a) $y' = -\frac{9}{4}$, tangent line $y = -\frac{9}{4}x+\frac{1}{4}$

(34). $y' = -\dfrac{\sqrt{y}}{\sqrt{x}}$. $y'' = \dfrac{1}{2x\sqrt{x}}$

(46). $y' = \dfrac{1}{2\sqrt{\tan^{-1}x(1+x^2)}}$

(49). $G'(x) = -1 - \dfrac{x\arccos x}{\sqrt{1-x^2}}$

(52). $F'(\theta) = \dfrac{\cos\theta}{2\sqrt{1-\sin\theta}\sqrt{\sin\theta}}$.