§3.

3.1. $y' = \dfrac{3\tan^2 x}{2\cos^2 x\sqrt{\tan^3 x}}$.

3.2. $y' = -\dfrac{10\sin\left(\dfrac{\pi}{6} - 5x\right)}{\cos^2\left(\dfrac{\pi}{6} - 5x\right)}$.

3.3. $y' = \dfrac{2x^2\cos x^2 - \sin x^2}{x^2}$.

3.4. $y' = -\dfrac{\sin\dfrac{x}{x+1}}{(x+1)^2}$.

3.5. $y' = \dfrac{2\sin x}{\cos^3 x} + \dfrac{2x}{\sin^2 x^2}$.

3.6. $f'(t) = \dfrac{-\sin t(1-\sin t) + \cos^2 t}{(1-\sin t)^2} = \dfrac{1}{1-\sin t}$; Do đó $f'\left(\dfrac{\pi}{6}\right) = 2$.

3.7. $y' = \dfrac{1}{2\sqrt{x}} - \dfrac{1}{2x\sqrt{x}} + x^9$.

3.8. $y' = \dfrac{-3x^2 + 2x + 2}{(x^2 - x + 1)^2}$.

3.9. $g'(\varphi) = \dfrac{\cos\varphi - \sin\varphi - 1}{(1-\cos\varphi)^2}$.

3.10. $y' = 4(1 + 3x + 5x^2)^3\,(3 + 10x)$.

3.11. $y' = -3(3 - \sin x)^2 \cos x$.

3.12. $y' = 3\sin 6x + \dfrac{2\sin x}{\cos^3 x}$.

3.13. $y' = \dfrac{1}{\sqrt{1 + 2\tan x}.\cos^2 x}$.

3.14. $y' = \dfrac{-x}{\sqrt{1+x^2}\,\sin^2\sqrt{1+x^2}}$.

3.15. $y' = \dfrac{1}{2\sqrt{x+\sqrt{x+\sqrt{x}}}}\left[1 + \dfrac{1}{2\sqrt{x+\sqrt{x}}}\left(1 + \dfrac{1}{2\sqrt{x}}\right)\right]$.

3.16. $f'(1) = 2$, $f'(4) = 36$, $f'\left(\dfrac{1}{4}\right) = -\dfrac{27}{2}$.

3.17. a) $\{\pm 2, \pm 4\}$.

b) $\left\{\dfrac{\pi}{12} + k\pi, \dfrac{\pi}{8} + k\dfrac{\pi}{2};\ k \in \mathbb{Z}\right\}$.

3.18. a) $x = \frac{2\pi}{3} + k\frac{4\pi}{3}, k \in \mathbb{Z}$.

b) $x = \frac{\pi}{8} + k\frac{\pi}{2}; x = \frac{\pi}{12} + k\pi, k \in \mathbb{Z}$.

3.19. a) $x = k\frac{\pi}{6}, k \in \mathbb{Z}$.

b) $x = \pm\frac{2\pi}{3} + k4\pi, k \in \mathbb{Z}$.

3.20. *Cách 1*. Chứng minh các biểu thức đã cho không phụ thuộc vào x. Từ đó suy ra $f'(x) = 0$.

a) $f(x) = 1 \Rightarrow f'(x) = 0$;

b) $f(x) = 1 \Rightarrow f'(x) = 0$;

c) $f(x) = \frac{1}{4}\left(\sqrt{2} - \sqrt{6}\right) \Rightarrow f'(x) = 0$;

d) $f(x) = \frac{3}{2} \Rightarrow f'(x) = 0$.

Cách 2. Lấy đạo hàm của $f(x)$ rồi chứng minh rằng $f'(x) = 0$.

3.21. -8 ; 0 ; 0.

3.22. 4.

3.23. $y' = x^2 + x - 2$

a) -2 ; 1.

b) -1 ; 0.

c) -4 ; 3.

3.24. $y' = 10a^3x - 5x^4$.

3.25. $y' = 2x - (a + b)$.

3.26. $y' = \frac{a}{a + b}$.

3.27. $y' = 2(x+2)\,(x+3)^2\,(3x^2+11x+9)$.

3.28. $y' = x\sin 2\alpha + \cos 2\alpha$.

3.29. $y' = mn\left[x^{n-1} + x^{m-1} + (m+n)x^{m+n-1}\right]$.

3.30. $y' = -(1-x)^2\,(1-x^2)\,(1-x^3)^2\,(1+6x+15x^2+14x^3)$.

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

3.32. $y' = \dfrac{1-x+4x^2}{(1-x)^3(1+x)^4}$ $\qquad (|x| \neq 1)$.

3.33. $y' = \dfrac{12-6x-6x^2+2x^3+5x^4-3x^5}{(1-x)^3}$ $\quad (x \neq 1)$.

3.34. $y' = \dfrac{1+2x^2}{\sqrt{1+x^2}}$.

3.35. $y' = \dfrac{a^2}{(a^2-x^2)\sqrt{a^2-x^2}}$ $\qquad (|x| < |a|)$.

3.36. $y' = x^2\sin x$.

3.37. $y' = -\sin 2x \,.\, \cos(\cos 2x)$.

3.38. $y' = \dfrac{x^2}{(\cos x + x\sin x)^2}$.

3.39. $y' = \dfrac{2}{\sin^2 x}$ $\qquad (x \neq k\pi,\ k \in \mathbb{Z})$.

3.40. $y' = 1 + \tan^6 x$ $\left(x \neq (2k+1)\dfrac{\pi}{2}, k \in \mathbb{Z}\right)$.