ASSIGNMENT #5
NYA- ELECTROTECH
SOLUTIONS

$\boxed{\text{P. 673}}$

#5. $f(x) = x^5 \qquad f'(x) = \boxed{5x^4}$

6. $f(x) = x^{12} \qquad f'(x) = \boxed{12x^{11}}$

7. $f(x) = -4x^9 \qquad f'(x) = \boxed{-36x^8}$

8. $f(x) = -7x^6 \qquad f'(x) = \boxed{-42x^5}$

9. $f(x) = 5x^4 - 3\pi \qquad f'(x) = \boxed{20x^3}$

10. $f(t) = 3t^5 + 4t \qquad f'(t) = \boxed{15t^4 + 4}$

11. $f(x) = x^2 + 2x \qquad f'(x) = \boxed{2x + 2}$

12. $f(x) = x^3 - 1.5x^2 \qquad f'(x) = \boxed{3x^2 - 3x}$

13. $p = 5r^3 - 2r + 1 \qquad p' = \boxed{15r^2 - 2}$

14. $y = 6x^2 - 6x + 5 \qquad y' = \boxed{12x - 6}$

15. $y = 25x^8 - 34x^5 - x \qquad y' = \boxed{200x^7 - 170x^4 - 1}$

16. $y = 4x^4 - 2x + 9 \qquad y' = \boxed{16x^3 - 2}$

17. $f(x) = -6x^7 + 5x^3 + \pi^2 \qquad f'(x) = \boxed{-42x^6 + 15x^2}$

18. $y = 13x^4 - 6x^3 - x - 1 \qquad y' = \boxed{52x^3 - 18x^2 - 1}$

19. $y = \frac{1}{3}x^3 + \frac{1}{2}x^2 \qquad y' = \boxed{x^2 + x}$

20. $f(z) = -\frac{1}{4}z^8 + \frac{1}{2}z^4 - 2^3 \qquad f'(z) = \boxed{-2z^7 + 2z^3}$

38. $y = ax^2 + 2x$ slope of tangent at $x=2$: $y' = 2ax + 2$

$y'(2) = 4a + 2$

slope is -4 : $-4 = 4a + 2$

$-6 = 4a$

$\boxed{a = -3/2}$

②

P. 679

#5. $y = \sqrt{x}$ $\quad y' = \frac{1}{2}x^{-1/2} = \boxed{\dfrac{1}{2\sqrt{x}}}$

6. $y = \sqrt[4]{x^3}$ $\quad y = (x^3)^{1/4}$

$= x^{3/4} \Longrightarrow y' = \frac{3}{4}x^{-1/4}$

$= \boxed{\dfrac{3}{4\sqrt[4]{x}}}$

7. $v = \dfrac{3}{t^2}$ $\quad v = 3t^{-2} \Longrightarrow v' = -6t^{-3} = \boxed{\dfrac{-6}{t^3}}$

8. $y = \dfrac{2}{x^4}$ $\quad y = 2x^{-4} \Longrightarrow y' = -8x^{-5} = \boxed{\dfrac{-8}{x^5}}$

9. $y = \dfrac{3}{\sqrt[3]{x}} = 3x^{-1/3} \Longrightarrow y' = -x^{-4/3}$

$= \boxed{\dfrac{-1}{x^{4/3}}}$

10. $y = \dfrac{55}{\sqrt[5]{x^2}} = 55x^{-2/5}$ $\quad y' = -22x^{-7/5} = \boxed{\dfrac{-22}{x^{7/5}}}$

11. $y = x\sqrt{x} - \dfrac{1}{x}$ $\quad y' = \left(\sqrt{x} + x\left(\dfrac{1}{2\sqrt{x}}\right)\right) + \dfrac{1}{x^2}$

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

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

$f'(x) = \boxed{-6x^{-4} + 6x^{-3}}$

P. 801 #32 $y = x\sin x + \cos x$ $\quad y' = (\sin x + x\cos x) + (-\sin x)$

$= \boxed{x\cos x}$

#34 $y = 2x\sin x + 2\cos x - x^2\cos x$

$y' = (2\sin x + 2x\cos x) - 2\sin x - (2x\cos x - x^2\sin x) = \boxed{x^2\sin x}$