AB.0301 BC.0202

LESSON 1 HW SOLUTION [4.2]

29. $f(x) = \frac{x^2}{2} + C$

30. $f(x) = 2x + C$

31. $f(x) = x^3 - x^2 + x + C$

32. $f(x) = -\cos x + C$

33. $f(x) = e^x + C$

34. $f(x) = \ln(x-1) + C$ when $x > 1$ or $f(x) = \ln|x-1| + C$ with no restriction on x

35. $f(x) = \frac{1}{x} + C$ $\quad 1 = \frac{1}{2} + C$ $\quad \therefore C = \frac{1}{2}$

$$\boxed{f(x) = \frac{1}{x} + \frac{1}{2}}$$

36. $f'(x) = \frac{1}{4}x^{-3/4}$ $\quad f(x) = \frac{1}{4}x^{1/4} \cdot 4 + C = x^{1/4} + C$

$-2 = (1)^{1/4} + C$ $\quad \therefore C = -3$

$$\boxed{f(x) = x^{1/4} - 3}$$

37. $f'(x) = \frac{1}{x+2}$ $\quad f(x) = \ln|x+2| + C$

$3 = \cancel{\ln(1)} + C$ $\quad \therefore C = 3$

$$\boxed{f(x) = \ln|x+2| + 3}$$ or $f(x) = \ln(x+2) + 3$ when $x > -2$

38. $f(x) = x^2 + x - \sin x + C$ $\quad 3 = 0 + 0 - \cancel{\sin(0)} + C$

$\therefore C = 3$

$$\boxed{f(x) = x^2 + x - \sin x + 3}$$

LESSON 1 HW SOLUTION [6.1]

1. $\int dy = \int (5x^4 - \sec^2 x)\,dx$

$$\boxed{y = x^5 - \tan x + C}$$

2. $\int dy = \int (\sec x \tan x - e^x)\,dx$

$$\boxed{y = \sec x - e^x + C}$$

3. $\int dy = \int (\sin x - e^{-x} + 8x^3)\,dx$

$$\boxed{y = -\cos x + e^{-x} + 2x^4 + C}$$

4. $\int dy = \int \left(\frac{1}{x} - \frac{1}{x^2}\right)dx$

$$\boxed{y = \ln|x| + \frac{1}{x} + C}$$

5. $\int dy = \int \left(5^x \ln 5 + \frac{1}{1+x^2}\right)dx$

$$\boxed{y = 5^x + \tan^{-1} x + C}$$

6. $\int dy = \int \left(\frac{1}{\sqrt{1-x^2}} - \frac{1}{\sqrt{x}}\right)dx$

$-x^{-1/2} \longrightarrow -x^{1/2} \cdot 2 + C$

$$\boxed{y = \sin^{-1} x - 2\sqrt{x} + C}$$

11. $\int dy = \int 3\sin x \, dx$

$y = -3\cos x + C$

$2 = -3(1) + C \quad \therefore C = 5$

$y = -3\cos x + 5$

12. $\int dy = \int (2e^x - \cos x)\, dx$

$y = 2e^x - \sin x + C$

$3 = 2 - 0 + C \quad \therefore C = 1$

$y = 2e^x - \sin x + 1$

13. $\int dy = \int (7x^6 - 3x^2 + 5)\, dx$

$y = x^7 - x^3 + 5x + C$

$1 = 1 - 1 + 5 + C \quad \therefore C = -4$

$y = x^7 - x^3 + 5x - 4$

14. $\int dy = \int (10x^9 + 5x^4 - 2x + 4)\, dx$

$y = x^{10} + x^5 - x^2 + 4x + C$

$6 = 1 + 1 - 1 + 4 + C \quad \therefore C = 1$

$y = x^{10} + x^5 - x^2 + 4x + 1$

15. $\int dy = \int \left(-\frac{1}{x^2} - \frac{3}{x^4} + 12\right) dx$

$y = \frac{1}{x} + \frac{1}{x^3} + 12x + C$

$3 = 1 + 1 + 12 + C \quad \therefore C = -11$

$y = \frac{1}{x} + \frac{1}{x^3} + 12x - 11$

16. $dy = \left(5\sec^2 x - \frac{3}{2}\sqrt{x}\right) dx$

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

$-\frac{3}{2}x^{3/2} \cdot \frac{2}{3} + C$

$y = 5\tan x - x^{3/2} + C$

$7 = 5(0) - 0 + C \quad \therefore C = 7$

$y = 5\tan x - x^{3/2} + 7$

17. $\int dy = \int \left(\frac{1}{1+t^2} + 2^t \ln 2\right) dt$

$y = \tan^{-1} t + 2^t + C$

$3 = 0 + 1 + C \quad \therefore C = 2$

$y = \tan^{-1} t + 2^t + 2$

18. $\int dx = \int \left(\frac{1}{t} - \frac{1}{t^2} + 6\right) dt$

$x = \ln|t| + \frac{1}{t} + 6t + C$

$0 = 0 + 1 + 6 + C \quad \therefore C = -7$

$x = \ln|t| + \frac{1}{t} + 6t - 7$

19. $\int dv = \int (4\sec t \tan t + e^t + 6t)\, dt$

$v = 4\sec t + e^t + 3t^2 + C$

$5 = 4(1) + 1 + 0 + C \quad \therefore C = 0$

$v = 4\sec t + e^t + 3t^2$

20. $\frac{ds}{dt} = 3t^2 - 2t$ distribute

$\int ds = \int (3t^2 - 2t)\, dt$

$s = t^3 - t^2 + C$

$0 = 1 - 1 + C \quad \therefore C = 0$

$s = t^3 - t^2$