

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

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

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

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

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

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

$3 = \ln(1) + C \therefore C = 3$

$$f(x) = \ln|x+2| + 3$$

or $f(x) = \ln(x+2) + 3$ when $x > -2$

38. $f(x) = x^2 + x - \sin x + C$

$3 = 0 + 0 - \sin(0) + C$

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

$\therefore C = 3$

LESSON 1 HW SOLUTION [6.1]

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

$$y = x^5 - \tan x + C$$

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

$$y = \sec x - e^x + C$$

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

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

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

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

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

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

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

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

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

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

$$y = -3 \cos x + C$$

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

$$y = -3 \cos x + 5$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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