1. Find the integral of $\frac{5}{8} e^{4t} (2t^2 + t + 3)$ with respect to t.

- ○ $\frac{5}{16} e^{4t} t^2 + \frac{5}{16} e^{4t} t + \frac{15 e^{4t}}{32}$ +constant
- ○ $\frac{25}{32} e^{4t} t + \frac{5 e^{4t}}{32}$ +constant
- ○ $\frac{5}{192} e^{4t} t (4t^2 + 3t + 18)$ +constant
- ● **$\frac{5}{16} e^{4t} t^2 + \frac{15 e^{4t}}{32}$ +constant**

2. Find the integral: $\int \frac{9}{2} e^{-2x} (x^2 + x + 1)\, dx$.

- ○ $-\frac{9}{4} e^{-2x} x^2 - \frac{27}{4} e^{-2x} x - \frac{27 e^{-2x}}{4}$ +constant
- ● **$-\frac{9}{4} e^{-2x} x^2 - \frac{9}{2} e^{-2x} x - \frac{9 e^{-2x}}{2}$ +constant**
- ○ $-\frac{9}{4} e^{-2x} x^2$ +constant
- ○ $-\frac{3}{8} e^{-2x} x (2x^2 + 3x + 6)$ +constant

3. What is $\int \frac{3}{5}\left(2t^2+t+4\right)\cos(2t)\,dt$?

- ○ $\frac{3}{5}t^2\sin(2t)+\frac{3}{10}t\sin(2t)+\frac{3}{2}\sin(2t)-\frac{3}{5}t\cos(2t)-\frac{3}{20}\cos(2t)+\text{constant}$
- ○ $\frac{1}{20}t\left(4t^2+3t+24\right)\sin(2t)+\text{constant}$
- ● **$\frac{3}{5}t^2\sin(2t)+\frac{3}{10}t\sin(2t)+\frac{9}{10}\sin(2t)+\frac{3}{5}t\cos(2t)+\frac{3}{20}\cos(2t)+\text{constant}$**
- ○ $\frac{6}{5}t\sin(2t)+\frac{3\cos^2(t)}{10}+\frac{3}{5}t\cos(2t)+\text{constant}$

4. Integrate $\frac{4}{5}\left(2t^2+2t+2\right)\sin(t)$ with respect to t.

- ● **$-\frac{8}{5}t^2\cos(t)+\frac{16}{5}t\sin(t)+\frac{8\sin(t)}{5}-\frac{8}{5}t\cos(t)+\frac{8\cos(t)}{5}+\text{constant}$**
- ○ $\frac{16}{5}t\sin(t)+\frac{8\sin(t)}{5}-\frac{16}{5}t\cos(t)+\frac{8\cos(t)}{5}+\text{constant}$
- ○ $-\frac{4}{15}t\left(2t^2+3t+6\right)\cos(t)+\text{constant}$
- ○ $-\frac{8}{5}t^2\cos(t)-\frac{16}{5}t\sin(t)-\frac{8\sin(t)}{5}-\frac{8}{5}t\cos(t)-\frac{24\cos(t)}{5}+\text{constant}$

5. Find the integral of $\frac{5}{9} e^t \cos(2t)$ with respect to t.

- ● **$\frac{2}{9} e^t \sin(2t) + \frac{1}{9} e^t \cos(2t)$ +constant**
- ○ $\frac{5}{18} e^t \sin(2t)$ +constant
- ○ $\frac{1}{3} e^t \sin(2t) - \frac{1}{9} e^t \cos(2t)$ +constant
- ○ $\frac{1}{6} e^t \sin(2t) + \frac{2}{9} e^t \cos(2t)$ +constant

6. What is $\int \frac{1}{2} e^{-2x} x^3 \, dx$?

- ○ $-\frac{9}{8} e^{-2x} x^2 - \frac{3}{8} e^{-2x} x - \frac{3 e^{-2x}}{16}$ +constant
- ○ $-\frac{1}{4} e^{-2x} x^3 + \frac{3}{8} e^{-2x} x^2 + \frac{3}{8} e^{-2x} x + \frac{3 e^{-2x}}{16}$ +constant
- ○ $-\frac{1}{16} e^{-2x} x^4$ +constant
- ● **$-\frac{1}{4} e^{-2x} x^3 - \frac{3}{8} e^{-2x} x^2 - \frac{3}{8} e^{-2x} x - \frac{3 e^{-2x}}{16}$ +constant**

7. What is $\int \frac{8}{7} e^t \sin(2t)\,dt$?

- ● **$\frac{8}{35} e^t \sin(2t) - \frac{16}{35} e^t \cos(2t)$ +constant**
- ○ $-\frac{8}{35} e^t \sin(2t) - \frac{24}{35} e^t \cos(2t)$ +constant
- ○ $\frac{16}{35} e^t \sin(2t) - \frac{12}{35} e^t \cos(2t)$ +constant
- ○ $-\frac{4}{7} e^t \cos(2t)$ +constant

8. Find the integral: $\int \frac{2}{9} t^3 \cos(t)\,dt$.

- ● **$\frac{2}{9} t^3 \sin(t) + \frac{2}{3} t^2 \cos(t) - \frac{4}{3} t \sin(t) - \frac{4\cos(t)}{3}$ +constant**
- ○ $\frac{1}{18} t^4 \sin(t)$ +constant
- ○ $\frac{2}{3} t^2 \sin(t) + \frac{2}{3} t^2 \cos(t) - \frac{4}{3} t \sin(t) - \frac{4\cos(t)}{3}$ +constant
- ○ $\frac{2}{9} t^3 \sin(t) - \frac{2}{3} t^2 \cos(t) + \frac{4}{3} t \sin(t) + \frac{4\cos(t)}{3}$ +constant

9. What is $\int \frac{2}{3} t^4 \sin(2t)\,dt$?

- ○ $-\frac{1}{15} t^5 \cos(2t) + \text{constant}$
- ● **$-\frac{1}{3} t^4 \cos(2t) + \frac{2}{3} t^3 \sin(2t) + t^2 \cos(2t) - t \sin(2t) - \frac{1}{2} \cos(2t) + \text{constant}$**
- ○ $-\frac{1}{3} t^4 \cos(2t) - \frac{2}{3} t^3 \sin(2t) - t^2 \cos(2t) + t \sin(2t) + \frac{1}{2} \cos(2t) + \text{constant}$
- ○ $-\frac{1}{3} t^4 \cos(2t) + \frac{4}{3} t^3 \sin(2t) + 2t^2 \cos(2t) - 2t \sin(2t) - \cos(2t) + \text{constant}$

10. Find the integral: $\int \frac{7}{4} (t^2 + 3t + 1) \sin(3t)\,dt$.

- ● **$-\frac{7}{12} t^2 \cos(3t) + \frac{7}{18} t \sin(3t) + \frac{7}{12} \sin(3t) - \frac{7}{4} t \cos(3t) - \frac{49}{108} \cos(3t) + \text{constant}$**
- ○ $-\frac{7}{72} t (2t^2 + 9t + 6) \cos(3t) + \text{constant}$
- ○ $\frac{7}{18} t \sin(3t) + \frac{7}{12} \sin(3t) - \frac{7}{6} t \cos(3t) - \frac{175}{108} \cos(3t) + \text{constant}$
- ○ $-\frac{7}{12} t^2 \cos(3t) - \frac{7}{18} t \sin(3t) - \frac{7}{12} \sin(3t) - \frac{7}{4} t \cos(3t) - \frac{77}{108} \cos(3t) + \text{constant}$

11. Find the integral of $\frac{5}{6}\,e^x\cos(x)$ with respect to x.

- ○ $\frac{5}{3}\,e^x\sin(x)-\frac{5}{6}\,e^x\cos(x)+\text{constant}$
- ○ $\frac{5}{4}\,e^x\sin(x)-\frac{5}{12}\,e^x\cos(x)+\text{constant}$
- ○ $\frac{5}{6}\,e^x\sin(x)+\text{constant}$
- ● **$\frac{5}{12}\,e^x\sin(x)+\frac{5}{12}\,e^x\cos(x)+\text{constant}$**

12. Find the integral: $\int\frac{4}{9}\,x^3\sin(3\,x)\,dx$.

- ○ $-\frac{4}{27}\,x^3\cos(3\,x)-\frac{4}{27}\,x^2\sin(3\,x)+\frac{8}{243}\sin(3\,x)-\frac{8}{81}\,x\cos(3\,x)+\text{constant}$
- ○ $-\frac{1}{27}\,x^4\cos(3\,x)+\text{constant}$
- ● **$-\frac{4}{27}\,x^3\cos(3\,x)+\frac{4}{27}\,x^2\sin(3\,x)-\frac{8}{243}\sin(3\,x)+\frac{8}{81}\,x\cos(3\,x)+\text{constant}$**
- ○ $\frac{4}{27}\,x^2\sin(3\,x)-\frac{4}{9}\,x^2\cos(3\,x)-\frac{8}{243}\sin(3\,x)+\frac{8}{81}\,x\cos(3\,x)+\text{constant}$

13. What is $\int_4^5 t \ln(2t)\,dt$?

- ○ $\frac{5}{8}t^2\ln(2t)+\frac{5t^2}{16}+\text{constant}$
- ○ $\frac{5}{8}t^3(\log(2t)-1)+\text{constant}$
- ● **$\frac{5}{8}t^2\ln(2t)-\frac{5t^2}{16}+\text{constant}$**
- ○ $\frac{5}{8}t^2\ln(2t)-\frac{5t^2}{8}+\text{constant}$

14. Find the integral: $\int_9^8 t^4\cos(t)\,dt$.

- ○ $\frac{8}{9}t^4\sin(t)-\frac{32}{9}t^3\cos(t)+\frac{32}{3}t^2\sin(t)-\frac{64\sin(t)}{3}+\frac{64}{3}t\cos(t)+\text{constant}$
- ○ $\frac{32}{9}t^3\sin(t)+\frac{32}{9}t^3\cos(t)-\frac{32}{3}t^2\sin(t)+\frac{64\sin(t)}{3}-\frac{64}{3}t\cos(t)+\text{constant}$
- ○ $\frac{8}{45}t^5\sin(t)+\text{constant}$
- ● **$\frac{8}{9}t^4\sin(t)+\frac{32}{9}t^3\cos(t)-\frac{32}{3}t^2\sin(t)+\frac{64\sin(t)}{3}-\frac{64}{3}t\cos(t)+\text{constant}$**

15. Find the integral of $\frac{4}{7}\left(x^2+3x+1\right)\sin(4x)$ with respect to x.

- ○ $-\frac{1}{42}x\left(2x^2+9x+6\right)\cos(4x)+\text{constant}$
- ● **$-\frac{1}{7}x^2\cos(4x)+\frac{1}{14}x\sin(4x)+\frac{3}{28}\sin(4x)-\frac{3}{7}x\cos(4x)-\frac{1}{8}\cos(4x)+\text{constant}$**
- ○ $-\frac{1}{7}x^2\cos(4x)-\frac{1}{14}x\sin(4x)-\frac{3}{28}\sin(4x)-\frac{3}{7}x\cos(4x)-\frac{9}{56}\cos(4x)+\text{constant}$
- ○ $-\frac{1}{14}x\sin(4x)-\frac{3}{28}\sin(4x)-\frac{2}{7}x\cos(4x)-\frac{25}{56}\cos(4x)+\text{constant}$

16. Find the integral: $\int\frac{2}{5}e^{-x}\left(x^2+2x+2\right)dx$.

- ○ $\frac{4e^{-x}}{5}-\frac{2}{5}e^{-x}x^2+\text{constant}$
- ● **$-\frac{2}{5}e^{-x}x^2-\frac{8e^{-x}x}{5}-\frac{12e^{-x}}{5}+\text{constant}$**
- ○ $\frac{4e^{-x}}{5}+\text{constant}$
- ○ $-\frac{2}{15}e^{-x}x\left(x^2+3x+6\right)+\text{constant}$

17. Find the integral of $\frac{5}{9} x^3 \sin(2x)$ with respect to x.

- ● **$-\frac{5}{18} x^3 \cos(2x) + \frac{5}{12} x^2 \sin(2x) - \frac{5}{24} \sin(2x) + \frac{5}{12} x \cos(2x)$ +constant**
- ○ $-\frac{5}{18} x^3 \cos(2x) - \frac{5}{12} x^2 \sin(2x) + \frac{5}{24} \sin(2x) - \frac{5}{12} x \cos(2x)$ +constant
- ○ $\frac{5}{12} x^2 \sin(2x) - \frac{5}{6} x^2 \cos(2x) - \frac{5}{24} \sin(2x) + \frac{5}{12} x \cos(2x)$ +constant
- ○ $-\frac{5}{72} x^4 \cos(2x)$ +constant

18. Integrate $\frac{1}{2} e^{-3t} t^3$ with respect to t.

- ● **$-\frac{1}{6} e^{-3t} t^3 - \frac{1}{6} e^{-3t} t^2 - \frac{1}{9} e^{-3t} t - \frac{e^{-3t}}{27}$ +constant**
- ○ $-\frac{1}{3} e^{-3t} t^2 + \frac{1}{9} e^{-3t} t + \frac{e^{-3t}}{27}$ +constant
- ○ $-\frac{1}{24} e^{-3t} t^4$ +constant
- ○ $-\frac{1}{6} e^{-3t} t^3 + \frac{1}{6} e^{-3t} t^2 + \frac{1}{9} e^{-3t} t + \frac{e^{-3t}}{27}$ +constant

19. Integrate $\frac{2}{5} e^x \sin(x)$ with respect to x.

- **$\frac{1}{5} e^x \sin(x) - \frac{1}{5} e^x \cos(x)$ +constant**
- $-\frac{2}{5} e^x \cos(x)$ +constant
- $-\frac{2}{5} e^x \sin(x) - \frac{4}{5} e^x \cos(x)$ +constant
- $-\frac{1}{5} e^x \sin(x) - \frac{3}{5} e^x \cos(x)$ +constant

20. Integrate $\frac{5}{6} t^3 \ln(4t)$ with respect to t.

- **$\frac{5}{24} t^4 \ln(4t) - \frac{5t^4}{96}$ +constant**
- $\frac{5}{24} t^4 \ln(4t) + \frac{5t^4}{96}$ +constant
- $\frac{5t^3}{24} - \frac{5t^4}{96}$ +constant
- $\frac{5}{24} t^5 (\log(4t) - 1)$ +constant