MCS-122
Tables of Integrals
Evaluate the following integrals.

1. \( \int \sin 2x \sin 7x \, dx \)

2. \( \int x^3 e^{5x} \, dx \)

3. \( \int \frac{x^2 + 4}{x^2 - 4} \, dx \)

4. \( \int e^{4x} \cos 2x \, dx \)

5. \( \int \frac{1}{\sin^3(3x)} \, dx \)

6. \( \int \frac{1}{x^2 + 4x - 5} \, dx \)

7. \( \int \frac{1}{4 + (2x + 5)^2} \, dx \)

8. \( \int \frac{1}{x^2 + 2x + 4} \, dx \)

9. \( \int xe^{2x^2} \cos(2x^2) \, dx \)
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Tables of Integrals
Evaluate the following integrals.

1. \[ \int \sin 2x \sin 7x \, dx = \frac{1}{45}(2 \cos 2x \sin 7x - 7 \sin 2x \cos 7x) + C \]
   Use \#10, \( a = 2, \, b = 7 \).

2. \[ \int x^3 e^{5x} \, dx = \frac{1}{5} x^3 e^{5x} - \frac{1}{25} 3x^2 e^{5x} + \frac{1}{125} 6xe^{5x} - \frac{1}{625} 6e^{5x} \]
   Use \#14, \( a = 5 \).

3. \[ \int \frac{x^2 + 4}{x^2 - 4} \, dx = x + \frac{8}{4}(\ln |x - 2| - \ln |x + 2|) + C \]

4. \[ \int e^{4x} \cos 2x \, dx = \frac{1}{20} e^{4x} (4 \cos 2x + 2 \sin 2x) + C \]
   Use \#9, \( a = 4, \, b = 2 \).

5. \[ \int \frac{1}{\sin^3(3x)} \, dx = \frac{1}{3} \left( \left( -\frac{1}{2} \cos x \right) + \frac{1}{2} \left( \frac{1}{2} \ln \left| \frac{\cos x - 1}{\cos x + 1} \right| \right) \right) C \]
   Substitute \( w = 3x \). Use \# 19.

6. \[ \int \frac{1}{x^2 + 4x - 5} \, dx = \frac{1}{6}(\ln |a - 1| - \ln |x + 5|) + C \]
   Factor. Use \#26.

7. \[ \int \frac{1}{4 + (2x + 5)^2} \, dx = \frac{1}{2} \left( \frac{1}{2} \arctan \frac{2x + 5}{2} \right) + C \]
   Substitute \( w = 2x + 5 \). Use \#24.

8. \[ \int \frac{1}{x^2 + 2x + 4} \, dx = \frac{1}{\sqrt{3}} \arctan \frac{x + 1}{\sqrt{3}} + C \]
   Complete square \((x^2 + 2x + 4 = (x + 1)^2 + 3)\). Substitute \( w = x + 1 \). Use \# 24.

9. \[ \int x e^{2x^2} \cos(2x^2) \, dx = \frac{1}{4} \left( \frac{1}{2} e^{2x^2} (\cos 2x^2 + \sin 2x^2) \right) + C \]
   Substitute \( w = 2x^2 \). Use \#9, \( a = 1, \, b = 1 \).