2 ✠ Antiderivatives

1. $\int x \sin 2x \, dx$ (by parts)
   $\frac{-x}{2} \cos 2x + \frac{1}{4} \sin 2x + C$

2. $\int x e^{x^2} \, dx$ (by substitution)
   $= \frac{1}{2} e^{x^2} + C$

3. $\int x e^{x} \, dx$ (by parts)
   $= x e^{x} - e^{x}$

4. $\int e^{x^2} \, dx$ (by integrand in a Taylor series)$= 1 + x^2 + \frac{1}{2} x^4 \mathcal{O}(x^6)$
   $x + \frac{x^3}{3} + \frac{x^5}{10} + C + \mathcal{O}(x^7)$

5. $\int x\sqrt{1+x} \, dx$
   $= \frac{2}{15}(1+x)^{\frac{3}{2}}(-2+3x) + C$

6. $\int \sec\theta \, d\theta$
   $= \ln(\sec\theta + \tan\theta) + C$

7. $\int \sec^2\theta \, d\theta$
   $= 2\frac{\sin\theta}{\cos\theta} + C$

8. $\int sech^2(\theta) = \int \frac{1}{\cosh^2(\theta)} \, d\theta$
   $= \frac{\sinh\theta}{\cosh\theta} + C$

9. $\int \frac{x^2+2}{7-x^2} \, dx$
   $= -x + \frac{9\sqrt{7}}{7} \arctan\left(\frac{x\sqrt{7}}{7}\right) + c$

10. $\int \frac{1}{ap-bp^2} \, dp$
    $= \frac{\ln|p|}{a} - \frac{\ln|bp-a|}{a}$