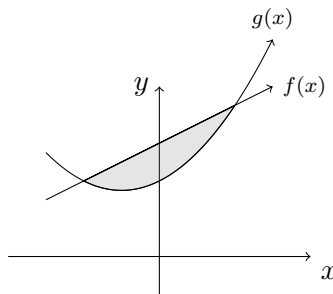## Warm-Up:

1. Evaluate the following integrals

   (a) $\int x^2(\sqrt{x} + 5) + e^2 \, dx$

   (b) $\int_1^2 \dfrac{3x^3 + 1}{4x} \, dx$

2. Find the area bounded between the line $f(x) = x + 3$ and the parabola $g(x) = x^2 + x + 2$.

   (a) Find where $f(x)$ and $g(x)$ intersect by setting them equal and solving for x.

   (b) Set up the integral and evaluate to find the area bounded by $f(x)$ and $g(x)$.

3. Evaluate the following indefinite integrals using substitution.

   (a) $\displaystyle\int \frac{\cos(\sqrt{x})}{\sqrt{x}}\,dx$

   (b) $\displaystyle\int \frac{e^x}{e^x + 1}\,dx$

4. Evaluate the following definite integrals using substitution.

   (a) $\displaystyle\int_2^3 \frac{xe^{x^2}}{3}\,dx$

   (b) $\displaystyle\int_0^1 \frac{x}{1 + 3x^2}\,dx$

5. Show the following two integrals are equivalent:

$$\int_0^2 3x\sqrt{9 - x^2}\,dx = \int_5^9 \frac{3\sqrt{u}}{2}\,du.$$