1. $\int_0^4 (\int_0^{\sqrt{y}} xy^2 dx) dy$
   - $\int_0^{\sqrt{y}} xy^2 dx =$
     $\frac{x^2 y^2}{2}\Big|_0^{\sqrt{y}} =$
     $\frac{y^3}{2}$
   - $\int_0^4 \frac{y^3}{2} dy =$
     $\frac{y^4}{8}\Big|_0^4 =$
     32
2. $\int_0^1 (\int_{x^2}^x (1+2y) dy) dx =$
   - $\int_{x^2}^x (1+2y) dy =$
     $y + y^2\big|_{x^2}^x =$
     $x \cancel{+ x^2} \cancel{- x^2} - x^4 =$
     $x - x^4$
   - $\int_0^1 x - x^4 dx =$
     $\frac{x^2}{2} - \frac{x^5}{5}\Big|_0^1 =$
     $\frac{1}{2} - \frac{1}{5} = \frac{3}{10}$