> **Difficulty guide for worksheet:**
> C-level or B-level exam problem: 1, 2, 3, 4
> A-level exam problem or challenge for extra study: 5, 6
> beyond the scope and/or removed from syllabus: none

1. Calculate each integral.

   (a) $\displaystyle\int_0^{\ln(4)} \int_0^{\ln(3)} \int_0^{\ln(2)} e^{-x+y+z}\, dz\,dy\,dx$

   (b) $\displaystyle\int_1^6 \int_0^{4-2y/3} \int_0^{12-2y-3z} \frac{1}{y}\, dx\,dz\,dy$

2. Sketch the region of integration for $\displaystyle\int_0^1 \int_0^{\sqrt{1-z^2}} \int_0^{\sqrt{1-y^2-z^2}} f(x,y,z)\, dx\,dy\,dz$.

3. Let $\mathcal{T}$ be the tetrahedron with vertices $(0,0,0)$, $P = (6,0,0)$, $Q = (0,4,0)$, and $R = (0,0,2)$.

   (a) Find an equation of the plane containing the points P, Q, and R.

   (b) Evaluate the integral $\displaystyle\iiint_{\mathcal{T}} y\, dV$.

4. Let $\mathcal{W}$ be the solid wedge above the xy-plane formed when the cylinder $x^2 + y^2 = 4$ is cut by the planes $z = 0$ and $y + z = 0$. Use a triple integral to find the volume of $\mathcal{W}$.

5. Let $\mathcal{W}$ be the solid wedge bounded by the parabolic cylinder $y = x^2$ and the planes $z = 3 - y$ and $z = 0$. Calculate $\displaystyle\iiint_{\mathcal{W}} 35z\, dV$.

6. Let $\mathcal{W}$ be the solid in the first octant bounded by the planes $y = 0$, $z = 0$, and $y = x$, and the elliptic cylinder $4x^2 + z^2 = 4$. Write the triple integral of the continuous function $f(x,y,z)$ in each of the six possible orders of integration.