

1. $\frac{7}{120}$

2. $-\frac{64}{15}$

3. $\begin{pmatrix} 2 & 1 \\ 2 & -4 \end{pmatrix}$

4. $\begin{pmatrix} -\frac{\pi}{2} & 0 & -1 \\ 0 & 1 & -1 \end{pmatrix}$

5. $\vec{\nabla}h(0,3) = \begin{pmatrix} 8 \\ -2 \end{pmatrix}$

6. **a)** V **b)** V **c)** F **d)** V

7. $\frac{1}{2}\ln(2) - \frac{5}{16}$

8. $\mathcal{V} = \frac{8\pi}{3}(2 - \sqrt{3})$

9. $\frac{162\pi}{5}$

10. **a)** $\mathcal{V}(D) = \frac{14\pi}{3}$

b) $(b_x, b_y, b_z) = \left(0, 0, \frac{45}{56}\right)$

11. $\frac{\pi a^6}{48}$