Multivariable Calculus - Math 253, Section 102

Fall 2006

Section 16.1

2. -4
6. 3500 ft^3.
12. 37.5.

Section 16.2

4. 116/3
10. $\ln(4/3)$.
12. $(3\sqrt{3} - 4\sqrt{2} + 1)/3$.
14. -2.
18. $2\ln 2 - 1$.
22. The solid is the region in the first octant which lies below the circular paraboloid $z = 2 - x^2 - y^2$ and above $[0, 1] \times [0, 1]$.
24. 12.
28. 44.
34. ≈ 3.327.

Section 16.3

2. 9/8.
6. 1/3.

8. $\frac{8}{3}\ln\left(\frac{10}{3}\right)$.
14. $\frac{3}{10}$.
16. $\frac{2}{15}$.
18. $\frac{7}{4}$.
20. $\frac{19}{210}$.
26. $\frac{16}{3}$.
28. $\frac{16}{3}r^3$.
40.

$$\int_0^3 \int_0^{\sqrt{9-y^2}} f(x,y)\,dx\,dy$$
$$= \int_0^{\sqrt{6}} \int_0^3 f(x,y)\,dy\,dx + \int_{\sqrt{6}}^3 \int_0^{9-x^2} f(x,y)\,dy\,dx.$$

44. $\frac{2}{9}(2^{\frac{3}{2}}-1)$.
48. $\frac{1}{4}(e^{16}-1)$.
50. 0.
54.

$$\iint_D f(x,y)\,dA$$
$$= \int_0^1 \int_0^{2y} f(x,y)\,dx\,dy + \int_1^3 \int_0^{3-y} f(x,y)\,dx\,dy$$
$$= \int_0^2 \int_{\frac{x}{2}}^{3-x} f(x,y)\,dy\,dx.$$