

MA122 Practice Problem Set 10

1. Solve 5, 6, 13 and 14 in Section 8-6

Answer: see back of the textbook for odd number questions; (6) $2x\sqrt{y+x^2} + C(x)$, $2x(\sqrt{5+x^2} - \sqrt{1+x^2})$; (14) $\frac{56-20\sqrt{5}}{3}$

2. Solve 18, 28, 30, 32 in Section 8-6

Answer: (18) $728/9$; (28) $(1 - e^{-1})^2$ cubic units; (30) $\frac{1}{2}(e^2 - e - 1)$; (32) $2 \ln 6$

3. **Describing regular regions:**

- (a) 1-6 in Section 8-7

Answer: (2) $R = \{(x, y) | x^2 \leq y \leq 9, 0 \leq x \leq 3\}$ or $R = \{(x, y) | 0 \leq x \leq \sqrt{y}, 0 \leq y \leq 9\}$; (4) $R = \{(x, y) | y - 1 \leq x \leq 5 - y, 0 \leq y \leq 3\}$; (6) $R = \{(x, y) | 4 - x \leq y \leq 4 + 3x - x^2, 0 \leq x \leq 4\}$

- (b) 11-14 in Section 8-7

Answer: (12) R consists of points on or inside the circle of radius 2 centered at the origin that are not inside the circle of radius 1 centered at the origin; neither (14) R consists of the points on or inside the square with corners at $(\pm 1, 0)$ and $(0, \pm 1)$; both

4. **Evaluating integrals:**

- (a) 8 in Section 8-7

Answer: 2

- (b) 20 in Section 8-7

Answer: $\frac{8\sqrt{2}}{3} - 2$

- (c) 24 in Section 8-7

Answer: $\frac{464}{5}$

- (d) 26 in Section 8-7

Answer: $1 - \ln 2$

5. **Reversing the order of integration:**

- (a) 29-32 in Section 8-7

Answer: (30) $\frac{596}{21}$; (32) 48.

- (b) 37-40 in Section 8-7
Answer: (38) $\frac{1}{3}$; (40) $\frac{56}{9}$

6. Finding volume:

- (a) 34 in Section 8-7
Answer: $\frac{4}{3}$ cubic units
- (b) 36 in Section 8-7
Answer: $\frac{1}{2}$ cubic units