

*Integration**Answers*

1 Estimating Future Population

1. About 3

2 Notation for Area

1. (a) 100 (b) 55 (c) 80
2. (a) $\int_0^{10} (x+5) dx$ (b) $\int_{20}^{30} (8-0.1t) dt$ (c) $\int_{-2}^3 (2x+15) dx$
3. (b) 99
4. (a) 120 (b) 50 (c) 2887.5 (d) 126.16
5. (b) 62.5 m
6. (a) 3100 (b) 6150

3 General Formula

1. (a) $x^2 + 7x + c$ (b) $10t - \frac{1}{2}t^2 + c$
- (c) $2.8w + 5.7w^2 + c$ (d) $-14x - \frac{11x^2}{2} + c$
2. (a) 30 (b) 46.5 (c) 54 (d) 115

4 The Reverse of Differentiation

1. $\frac{1}{10}x^{10} + c$
2. $-\frac{1}{7x^7} + c$
3. $-\frac{1}{4x^4} + c$
4. $\frac{x^5}{5} + \frac{x^8}{8} + c$
5. $\ln x - \frac{1}{x} + c$
6. $\frac{3}{4}x^8 + c$
7. $-\frac{3}{2t^2} + c$
8. $\ln w^2 + c$
9. $e^p - \frac{3p^2}{2} + c$

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10. $2q + \frac{1}{2q^2} + c$

11. $\frac{x^4}{8} + c$

12. $\frac{x^8}{6} + c$

13. $-\frac{3}{4y^2} + c$

14. $x^2 - \frac{2}{3} \ln x + c$

15. $\frac{1}{4} e^k - \frac{1}{2k^2} + c$

16. $\frac{3}{4} x - \frac{x^6}{12} + c$

17. $e^m + \frac{2}{15m^3} + c$

18. $\frac{5x^3}{6} - \frac{x^2}{4} + \frac{x}{2} + c$

19. $\frac{z^3}{15} - \frac{1}{5} \ln z + c$

20. $2x - \ln x + c$

5 Finding Areas

1. (a) $\frac{250}{3}$ (b) 159.25 (c) $\frac{5}{6}$

(d) $2e^3 - \frac{2}{e^2} + \frac{35}{3}$ (e) $4 + \ln 3$ (f) 1.35 to 3 significant figures

2. (a) 40.5 (b) 13.0 (c) 0.375 (d) 2.12

3. $\frac{1}{6}$

4. $\frac{2}{11}, \frac{20}{11}$

6 Initial Conditions

1. (a) $h = 2t - 5t^2 + 1000$ (b) $t = 14.34$

2. (a) $x = 5t + \frac{1}{2} t^2 - \frac{1}{12} t^3 - 30$ (b) $x(7.7) > 0, x(7.8) < 0$

3. (a) $C = \frac{1}{3} Q^3 - \frac{3}{2} Q^2 + 5Q + 5$ (b) 114