

Chapter 17

Exercise 17A

- 1 a $A = 2$
 b $A = 8$
 c $A = 22$
 d $A = \frac{205}{24}$
 e $A = \frac{12}{25}$
 f $A = 1$
- 2 a $A = 20\frac{5}{6}$
 b $A = 6\frac{5}{6}$
 c $\frac{33}{2}$
 d $\frac{1172}{625}$
 e $A = \frac{9}{4}$
 f $A = 33\frac{9}{12}$
- 3 a $A = 86$
 b $A = 19\frac{2}{3}$
 c $A = \sqrt{6} - \sqrt{2} + 2\sqrt{3}$
 d $A = \frac{937}{12}$
 e $A = \frac{37}{6}$
 f $A = 46$
- 4 a $P(-2, 0)$
 b $A = 45\frac{5}{6}$
- 5 a $A(1, 0), B(5, 0)$
 b $A = 2\frac{2}{15}$
- 6 a i Hint: use Ruffini's law to show that the remainder is zero
 ii $x^3 - 3x^2 - 6x + 8 = (x - 1)(x - 4)(x + 2)$
 b i $K(-2, 0), L(1, 0), M(4, 0)$
 ii $A = 40\frac{1}{2}$
- 7 a i, ii Maximum SP at $(-\frac{2}{3}, -\frac{41}{27})$, minimum SP at $(2, -11)$
 b $A = 17\frac{1}{4}$

- 8 a $P(2, -1)$
 b $A = \frac{1}{3}$
- 9 a $a = -3, b = -2, c = \frac{\pi}{4}$
 b $A = 3$
- 10 a $a = \frac{1}{2}, b = -3, c = -2$
 b $A = 6\frac{1}{2}$
- 11 a $b = 5, c = 6$
 b TK
- 12 a $A = 9605.25$
 b i $y = 0.0001x^3 - 0.02x^2 + 0.5x + 110$
 ii The coastline shifts towards the fixed line without changing its shape
 c $A = 794.5m^2$
- 13 The entire job costs £2607.5

Exercise 17B

- 1 a $A = \frac{116}{3}$
 b $A = 15$
 c $A = 34$
 d $A = 108$
- 2 a i $x = 1$ or -3
 ii $A = 10\frac{2}{3}$
 b i $(-1, 5), (2, -1)$
 ii $A = \frac{9}{2}$
 c i $(-\frac{3}{2}, -\frac{41}{4}), (2, 2)$
 ii $A = \frac{343}{12}$
 d i $(1, 1), (4, -5)$
 ii $A = \frac{9}{2}$
- 3 $A = \frac{4681}{12}$
- 4 a $a = \frac{2}{3}, b = 4, c = 1$
 b $R(7, 7)$
 c $A = 127$

- 5 a Hint: use Ruffini's law to show that the remainder is zero
 b $x^3 - x^2 - 8x + 12 = (x + 3)(x - 2)^2$
 c i Hint: the curve and the line have the same derivative in M
 ii $M(2, 1)$
 d $N(-3, -9)$
 e $A = 52\frac{1}{12}$
- 6 a $k = 3$
 b i Pupil's own answer
 ii $P(-\frac{5}{2}, \frac{57}{2})$
 c $A = 25\frac{1}{96}$
- 7 a $Q(\frac{5\pi}{18}, -\sqrt{3}), R(\frac{7\pi}{18}, -\sqrt{3})$
 b $A = \frac{2}{3} - \frac{\sqrt{3}\pi}{9}$
- 8 a $f(x) = -x^2 + 6x$
 b i $P(5, 5)$
 ii $y_l = -4x + 25$
 c $A = 41\frac{2}{3}$
- 9 a $P(-\frac{5}{3}, 2\frac{13}{27})$
 b i $R(1, 1)$
 ii $Q(-3, -11)$
 c $A = 21\frac{1}{3}$
- 10 a $A = \frac{16}{3}$
- 11 a $A(\frac{\pi}{2}, 0), B(\frac{7\pi}{6}, \frac{\sqrt{3}}{2})$
 b $A = 2\frac{1}{4}$
- 12 a $A(\frac{\pi}{3}, -\frac{3}{2}), B(\frac{5\pi}{3}, -\frac{3}{2})$
 b $A = \frac{8\pi}{3} + 7\sqrt{3}$
- 13 a $a = 2, b = 1$
 b i $g(x) = -4x^2 + 8x + 22$
 ii $M = -1$
 $N = 175$
 c $A = \frac{5324}{75}$
- 14 $A = \frac{9}{8}$
- 15 a $A = 374\frac{2}{5}$
 b $V = 56160m^3$