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 $\left(-\frac{2}{3}, -\frac{41}{27}\right)$, 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** $\left(-\frac{3}{2}, -\frac{41}{4}\right), (2, 2)$

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 $P\left(-\frac{5}{2}, \frac{57}{2}\right)$

c $A = 25\frac{1}{96}$

7 **a** $Q\left(\frac{5\pi}{18}, -\sqrt{3}\right), R\left(\frac{7\pi}{18}, -\sqrt{3}\right)$

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** $P\left(-\frac{5}{3}, 2\frac{13}{27}\right)$

b **i** $R(1, 1)$

ii $Q(-3, -11)$

c $A = 21\frac{1}{3}$

10 **a** $A = \frac{16}{3}$

11 **a** $A\left(\frac{\pi}{2}, 0\right), B\left(\frac{7\pi}{6}, \frac{\sqrt{3}}{2}\right)$

b $A = 2\frac{1}{4}$

12 **a** $A\left(\frac{\pi}{3}, -\frac{3}{2}\right), B\left(\frac{5\pi}{3}, -\frac{3}{2}\right)$

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 $V = 56160m^3$