

1. Solve the inequality

$$|2x - 3| < x.$$

[4]  
(nov2003)

2. Given that  $\frac{2^x}{4^y} = 1$  and  $3^x(\sqrt{3})^y = 9$ , obtain two linear equations in  $x$  and  $y$ .  
Hence determine the values of  $x$  and  $y$ .

[4]  
(june2004)

3. Solve the inequality  $|1 - 2x| \leq |3x + 6|$ .

[4]  
(nov2004)

4. (a) Given the function  $f(x) = 2(x + 3)^2 + 7$ , state

(i) the coordinates of the turning point, [1]

(ii) the nature of the turning point. [1]

(b) Given that the equation  $\frac{x^2 + 4}{3} + \frac{84}{x^2 + 4} = 11$  is solved by using the substitution  $y = x^2 + 4$ ,

(i) reduce the equation to a quadratic in  $y$ , [3]

(ii) hence solve the original equation. [3]

(nov2004)

5. Solve the inequality  $|x + 3| > |2x - 4|$ .

[4]  
(june2005)

6 Express  $1 - 10x + x^2$  in the form  $A(1-x)^2 + B(1+x)^2$ , where  $A$  and  $B$  are constants. [2]

Given that  $1 - 10x + x^2 = 0$ , show that  $\frac{(1+x)^2}{(1-x)^2} = \frac{3}{4}$ .

By taking positive square roots, show that one of the roots of the equation

$1 - 10x + x^2 = 0$  is given by  $x = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ . [3]

- 8 (i) Express  $4x^2 + 6x + 3$  in the form  $(ax + b)^2 + c$ , where  $a$ ,  $b$  and  $c$  are constants whose values are to be found. [2]
- (ii) Find the set of values of  $x$  for which  $4x^2 + 6x + 3 > 13$ . [3]
- (iii) Find the set of values taken by  $\frac{1}{4x^2 + 6x + 3}$  for real  $x$ . [2]

- (b) Solve the simultaneous equations  $2\log y = \log 2 + \log x$  and  $2^y = 4^x$ . [5]

1. Solve the inequality  $|2x + 3| > 7$ . [3]

2. Find the exact value of the solution to the equation  $2e^{2x} - 7e^x - 4 = 0$  [3]

1. (a) Solve the inequality  $(0.2)^{2x-3} > 10^6$  [3]

(b) Solve the equation  $3\sqrt{x} - 11 = 4x^{-\frac{1}{2}}$  [4]

(june2009)

3 Express in partial fractions

$$\frac{5x^2 + 7x + 9}{(x+2)^2(3-x)} \quad [5]$$

1. Express  $\frac{3x + 8}{(2x + 1)(x^2 + 3)}$  in partial fractions. [4]

2 (a) Find the product of  $x^2 - 3x - 5$  and  $x^2 + 3x - 2$ . [1]

(b) Solve the inequality

$$2x^2 - 3x < 5. \quad [3]$$

Find the value of  $x$  which satisfies the equation

$$3(2^{2x+2}) - 2^{1-2x} = -5 \quad [5]$$

Express  $\frac{x^4}{x^4 - 1}$  in partial fractions. [5]

Solve the following equations

(a)  $3(7^x) - 2(7^{-x}) = 5,$  [5]

(b)  $\log_{10}(2x^3 + 1) - 3\log_{10}x = 1.$  [3]

1 Solve the simultaneous equations

$$2^x + 3^y = 5$$

$$2^{x+2} - 3^{y+1} = 13.$$

[4]

1 Solve the equation

$$5^{x-1} + 5^{x-2} = 30. \quad [3]$$

2 Solve the inequality

$$\frac{3x+1}{9-x^2} \geq -1. \quad [4]$$

1 Solve the equation  $\frac{27^{4x}}{3^4} = 9^{(x-1)}.$  [3]

1 Express  $\frac{6}{3 + \sqrt{5} + \sqrt{14}}$  in the form  $a + b\sqrt{c} + d\sqrt{e}$  where  $a, b, c, d$  and  $e$  are real numbers. [3]

2 Solve the inequality

$$\frac{10-2x}{x-2} > x+1. \quad [4]$$

6 Express  $\frac{2x^3 - 17x - 1}{(x-2)(x^2+5)}$  in partial fractions. [6]

