

Entrance Scholarships

MATHEMATICS I

March 2012

Time allowed 1 hour

You may try the questions in any order.

No calculating aids may be used.

Show all working.

RADLEY



1. a) Work out exactly

i) 60.9×2.74 (3 marks)

ii) $285.156 \div 8.9$ (3 marks)

b) Give the answers to the following as fractions in their simplest form

i) $\frac{13}{28} + \frac{2}{7}$ (3 marks)

ii) $2\frac{7}{9} \times 4\frac{1}{5}$ (3 marks)

iii) $2\frac{7}{10} \div \left(2\frac{13}{15} - 1\frac{2}{3}\right)$ (4 marks)

2. Work out as simply as possible

a) $657^2 - 343^2$ (4 marks)

b) $(83 \times 59) + 59^2 - (59 \times 42)$ (4 marks)

c) $(43 \times 64) + (35 \times 36) + (64 \times 21) - (36 \times 71)$ (4 marks)

d) $\frac{721^2 - (261 \times 721)}{7.21 \times 23}$ (5 marks)

3. a) Multiply out and simplify

i) $(a + 5b)^2$ (3 marks)

ii) $(2a + b)(24a^2 - 12ab + 6b^2)$ (3 marks)

b) Factorise fully

i) $12x^2y^3 + 16xy^4$ (3 marks)

ii) $12a^2 - 27b^2$ (3 marks)

iii) $x^2 + 21x + 38$ (3 marks)

c) Simplify

i) $\frac{x^2 - y^2}{xz + yz}$ (3 marks)

ii) $\frac{x^5}{y^2} \div x^2 y^3$ (3 marks)

4. Solve each of these equations for x

a) $3(x+5) + 4(3x-9) = 99$ (3 marks)

b) $\frac{7x+3}{4} - \frac{5x-7}{6} = 12$ (4 marks)

c) $(2x+3)(2x+9) - 4x^2 = 123$ (5 marks)

Rearrange the following formula to make x the subject

d) $\frac{a}{x+b} = \frac{c}{x}$ (4 marks)

5. Solve each of these pairs of equations for x and y

a) $3x + 5y = 36$
 $7x + 2y = 55$ (6 marks)

b) $\frac{1}{4}x - \frac{1}{3}y = 6$
 $\frac{2}{3}x - \frac{3}{5}y = 29$ (6 marks)

6. Solve each of these equations for x

a) $x^2 + 3x - 18 = 0$ (4 marks)

b) $6x^2 - 17x - 14 = 0$ (6 marks)

c) $\frac{15}{x-2} + \frac{16}{x-3} = 7$ (8 marks)

Total 100 marks