

Entrance Scholarships

MATHEMATICS I

March 2013

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) 8.02×3.79 (3 marks)

ii) $52.205 \div 0.53$ (3 marks)

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

i) $\frac{31}{40} - \frac{3}{8}$ (3 marks)

ii) $8\frac{2}{7} \times 8\frac{1}{6}$ (3 marks)

iii) $\left(4\frac{2}{3} + 3\frac{1}{8}\right) \div 4\frac{7}{12}$ (4 marks)

2. Work out as simply as possible

a) $793^2 - 207^2$ (4 marks)

b) $74^2 - (17 \times 74) + (74 \times 43)$ (4 marks)

c) $(57 \times 16) + (53 \times 84) - (16 \times 83) + (84 \times 31)$ (4 marks)

d) $\frac{(651 \times 349) + 651^2}{65.1 \times 40}$ (5 marks)

3. a) Multiply out and simplify

i) $(6a - b)^2$ (3 marks)

ii) $(3x^2 - 6xy + 12y^2)(x + 2y)$ (3 marks)

b) Factorise fully

i) $28a^3b - 35a^2b^2$ (3 marks)

ii) $54x^2 - 6y^2$ (3 marks)

iii) $x^2 - 5x - 36$ (3 marks)

c) Simplify

i) $\frac{18x^3}{9x^2 + 27x^4}$ (3 marks)

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

4. Solve each of these equations for x

a) $5(3x - 7) - 2(x - 4) = 129$ (3 marks)

b) $\frac{9x + 4}{7} + \frac{7x - 11}{3} = 15$ (4 marks)

c) $(x + 9)(x - 2) - (x + 2)^2 = 17$ (5 marks)

Rearrange the following formula to make x the subject

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

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

a) $\begin{aligned} 8x - 3y &= 63 \\ 6x - 2y &= 52 \end{aligned}$ (6 marks)

b) $\begin{aligned} \frac{5}{6}x + \frac{2}{5}y &= 23 \\ \frac{7}{9}x + \frac{3}{4}y &= 29 \end{aligned}$ (6 marks)

6. Solve each of these equations for x

a) $x^2 - 19x + 48 = 0$ (4 marks)

b) $4x^2 + 5x - 21 = 0$ (6 marks)

c) $\frac{98}{x + 5} - \frac{40}{x - 1} = 2$ (8 marks)

Total 100 marks