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

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

4. Solve each of these equations for x

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

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

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

Rearrange the following formula to make x the subject

d) $\dfrac{x+a}{b}=\dfrac{x+c}{d}$ *(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) $\dfrac{98}{x+5}-\dfrac{40}{x-1}=2$ *(8 marks)*

Total 100 marks