RADLEY COLLEGE
Entrance Scholarships

MATHEMATICS I

March 2008

Time allowed 1 hour

You may try the questions in any order.

No calculating aids may be used.

Show all working.

1. a) Work out exactly

i) 60.4×5.73 *(3 marks)*

ii) $2085.6 \div 7.9$ *(3 marks)*

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

i) $\frac{2}{15} + \frac{1}{5}$ *(3 marks)*

ii) $5\frac{3}{5} \times 3\frac{1}{8}$ *(3 marks)*

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

2. Work out as simply as possible

a) $741^2 - 259^2$ *(4 marks)*

b) $(94 \times 67) - 67^2 + (67 \times 73)$ *(4 marks)*

c) $(73 \times 28) - (63 \times 27) + (45 \times 73) + (27 \times 36)$ *(4 marks)*

d) $\frac{843^2 - (747 \times 843)}{48 \times 8.43}$ *(5 marks)*

3. a) Multiply out and simplify

i) $(x + 3y)^2$ *(3 marks)*

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

b) Factorise fully

i) $6a^2b^2 - 9ab^3$ *(3 marks)*

ii) $28a^2 - 63b^2$ *(3 marks)*

iii) $x^2 + 11x + 30$ *(3 marks)*

c) Simplify

i) $\dfrac{a^2 - b^2}{ac - bc}$ *(3 marks)*

ii) $\dfrac{x^4}{y^2} \div \dfrac{x^2}{y^5}$ *(3 marks)*

4. Solve each of these equations for x

a) $7(x + 4) - 2(x - 3) = 79$ *(3 marks)*

b) $\dfrac{2x - 1}{5} + \dfrac{x + 7}{3} = 8$ *(4 marks)*

c) $(4x + 1)(x + 3) - 4x^2 = 68$ *(5 marks)*

Rearrange the following formula to make x the subject

d) $\dfrac{a}{x - b} = \dfrac{c}{x - d}$ *(4 marks)*

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

a) $2x + 5y = 25$
$3x + 2y = 21$ *(6 marks)*

b) $\dfrac{5}{6}x - \dfrac{1}{2}y = 10$
$\dfrac{2}{3}x - \dfrac{3}{5}y = 4$ *(6 marks)*

6. Solve each of these equations for x

a) $x^2 - 12x + 20 = 0$ *(4 marks)*

b) $6x^2 + 7x - 3 = 0$ *(6 marks)*

c) $\dfrac{36}{x + 7} + \dfrac{28}{x + 2} = 7$ *(8 marks)*

Total 100 marks