RADLEY COLLEGE
Entrance Scholarships

MATHEMATICS I

March 2006

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) 7.05×96.2 *(3 marks)*

   ii) $3.6288 \div 0.28$ *(3 marks)*

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

   i) $\frac{5}{8} + \frac{1}{24}$ *(3 marks)*

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

   iii) $\left(4\frac{1}{3} - 2\frac{3}{4}\right) \div 1\frac{3}{16}$ *(4 marks)*

2. Work out as simply as possible

a) $562^2 - 438^2$ *(4 marks)*

b) $(34 \times 89) + 34^2 - (23 \times 34)$ *(4 marks)*

c) $(89 \times 35) + (65 \times 11) - (11 \times 76) + (54 \times 89)$ *(4 marks)*

d) $\dfrac{(400 \times 306) - 306^2}{3.06 \times 47}$ *(4 marks)*

3. a) Multiply out and simplify

i) $(3a + 4b)^2$ *(3 marks)*

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

b) Factorise fully

i) $18ab - 12a^2b$ *(3 marks)*

ii) $18a^2 - 50b^2$ *(3 marks)*

iii) $x^2 + 17x + 60$ *(3 marks)*

c) Simplify

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

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

4. Solve each of these equations for x

a) $8(x+3)-3(x-1)=57$ *(3 marks)*

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

c) $(3x+1)(x+5)-3x^2=117$ *(4 marks)*

Rearrange the following formula to make x the subject

d) $\frac{a}{x+b}=\frac{c}{x-d}$ *(6 marks)*

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

a) $3x+5y=19$
$4x-3y=6$ *(6 marks)*

b) $\frac{1}{8}x+\frac{1}{7}y=8$
$\frac{3}{4}x+\frac{2}{5}y=32$ *(6 marks)*

6. Solve each of these equations for x

a) $x^2-7x-18=0$ *(4 marks)*

b) $4x^2-8x+3=0$ *(6 marks)*

c) $\frac{28}{x-3}-\frac{27}{x+2}=4$ *(8 marks)*

Total **100 marks**