RADLEY COLLEGE
Entrance Scholarships

MATHEMATICS I

March 2011

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) 38.5×40.7 *(3 marks)*

ii) $28.046 \div 0.37$ *(3 marks)*

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

i) $\frac{35}{36} - \frac{2}{9}$ *(3 marks)*

ii) $5\frac{1}{4} \div 9\frac{1}{3}$ *(3 marks)*

iii) $4\frac{2}{7} \times \left(5\frac{2}{3} + 1\frac{4}{5}\right)$ *(4 marks)*

2. Work out as simply as possible

a) $587^2 - 413^2$ *(4 marks)*

b) $89^2 - (26 \times 89) + (89 \times 37)$ *(4 marks)*

c) $(39 \times 62) - (38 \times 55) + (62 \times 23) + (17 \times 38)$ *(4 marks)*

d) $\frac{827^2 + (827 \times 173)}{8.27 \times 125}$ *(5 marks)*

3. a) Multiply out and simplify

i) $(x - 4y)^2$ *(3 marks)*

ii) $(x - 2y)(7x^2 + 14xy + 28y^2)$ *(3 marks)*

b) Factorise fully

i) $15a^3b^2 + 10a^4b$ *(3 marks)*

ii) $28x^2 - 63y^2$ *(3 marks)*

iii) $x^2 - 11x + 28$ *(3 marks)*

c) Simplify

i) $\dfrac{16x^3}{8x^4 - 12x^2}$ *(3 marks)*

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

4. Solve each of these equations for x

a) $5(4x + 7) - 3(5 - 2x) = 98$ *(3 marks)*

b) $\dfrac{5x - 4}{3} + \dfrac{3x + 1}{4} = 11$ *(4 marks)*

c) $(x + 4)^2 - (x - 1)(x + 8) = 29$ *(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) $\begin{aligned} 7x - 3y &= 37 \\ 4x + 5y &= 48 \end{aligned}$ *(6 marks)*

b) $\begin{aligned} \frac{1}{3}x + \frac{3}{7}y &= 17 \\ \frac{7}{8}x - \frac{2}{3}y &= 7 \end{aligned}$ *(6 marks)*

6. Solve each of these equations for x

a) $x^2 - 5x - 24 = 0$ *(4 marks)*

b) $2x^2 - 19x + 9 = 0$ *(6 marks)*

c) $\dfrac{15}{x - 2} - \dfrac{8}{x + 1} = 2$ *(8 marks)*

Total 100 marks