RADLEY COLLEGE
Entrance Scholarships

MATHEMATICS I

March 2007

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) 42.8×9.07 *(3 marks)*

ii) $475.45 \div 37$ *(3 marks)*

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

i) $\frac{11}{18} - \frac{1}{6}$ *(3 marks)*

ii) $4\frac{1}{5} \div 4\frac{2}{3}$ *(3 marks)*

iii) $\left(2\frac{3}{5} + 1\frac{1}{4}\right) \times 2\frac{6}{7}$ *(4 marks)*

2. Work out as simply as possible

a) $638^2 - 362^2$ *(4 marks)*

b) $(93 \times 59) - 59^2 - (59 \times 14)$ *(4 marks)*

c) $(25 \times 69) - (31 \times 89) + (58 \times 31) + (69 \times 44)$ *(4 marks)*

d) $\dfrac{(327 \times 298) + 298^2}{29.8 \times 25}$ *(5 marks)*

3. a) Multiply out and simplify

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

ii) $(3x - y)(18x^2 + 6xy + 2y^2)$ *(3 marks)*

b) Factorise fully

i) $20x^2y + 24xy^2$ *(3 marks)*

ii) $12x^2 - 27y^2$ *(3 marks)*

iii) $x^2 - 9x + 20$ *(3 marks)*

c) Simplify

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

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

4. Solve each of these equations for x

a) $5(3x-1)+6(x-5)=28$ *(3 marks)*

b) $\dfrac{4x-2}{3}-\dfrac{x+1}{4}=11$ *(4 marks)*

c) $(x+5)^2-(x-3)(x+6)=92$ *(5 marks)*

Rearrange the following formula to make x the subject

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

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

a) $\begin{aligned}4x-5y&=19\\3x+2y&=43\end{aligned}$ *(6 marks)*

b) $\begin{aligned}\frac{2}{3}x+\frac{2}{5}y&=22\\\frac{3}{4}x-\frac{2}{3}y&=8\end{aligned}$ *(6 marks)*

6. Solve each of these equations for x

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

b) $2x^2+13x+20=0$ *(6 marks)*

c) $\dfrac{18}{x+4}+\dfrac{14}{x+5}=5$ *(8 marks)*

Total 100 marks