RADLEY COLLEGE
Entrance Scholarships

MATHEMATICS I

March 2010

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) 7.09×4.82 *(3 marks)*

ii) $537.742 \div 6.7$ *(3 marks)*

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

i) $\frac{2}{7} + \frac{4}{35}$ *(3 marks)*

ii) $9\frac{1}{3} \times 1\frac{1}{8}$ *(3 marks)*

iii) $\left(3\frac{5}{12} - 1\frac{1}{2}\right) \div 5\frac{3}{4}$ *(4 marks)*

2. Work out as simply as possible

a) $631^2 - 369^2$ *(4 marks)*

b) $(92 \times 73) + (73 \times 81) - 73^2$ *(4 marks)*

c) $(28 \times 83) + (17 \times 36) - (53 \times 17) + (83 \times 55)$ *(4 marks)*

d) $\dfrac{(529 \times 769) - 529^2}{20 \times 52.9}$ *(5 marks)*

3. a) Multiply out and simplify

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

ii) $(18a^2 - 6ab + 2b^2)(3a + b)$ *(3 marks)*

b) Factorise fully

i) $25ab^4 - 10a^2b^3$ *(3 marks)*

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

iii) $x^2 - 4x - 21$ *(3 marks)*

c) Simplify

i) $\dfrac{7x^2}{21x^3 + 14x}$ *(3 marks)*

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

4. Solve each of these equations for x

a) $3(2x - 3) + 9(x - 4) = 30$ *(3 marks)*

b) $\dfrac{4x + 3}{5} - \dfrac{x - 6}{7} = 10$ *(4 marks)*

c) $(x + 4)(x - 1) - (x - 4)^2 = 79$ *(5 marks)*

Rearrange the following formula to make x the subject

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

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

a)
$$7x - 3y = 51$$
$$5x - 2y = 37$$
(6 marks)

b)
$$\frac{1}{2}x + \frac{4}{5}y = 17$$
$$\frac{7}{9}x + \frac{1}{2}y = 19$$
(6 marks)

6. Solve each of these equations for x

a) $x^2 - 17x + 42 = 0$ *(4 marks)*

b) $4x^2 + 7x - 15 = 0$ *(6 marks)*

c) $\dfrac{8}{x - 3} + \dfrac{3}{x - 4} = 3$ *(8 marks)*

Total 100 marks