



RADLEY

Entrance Scholarships

MATHEMATICS I

March 2016

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) 4.93×60.9 (3 marks)

ii) $262.65 \div 8.5$ (3 marks)

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

i) $\frac{3}{4} + \frac{1}{36}$ (3 marks)

ii) $6\frac{3}{7} \div 5\frac{5}{8}$ (3 marks)

iii) $6\frac{6}{7} \times \left(7\frac{3}{8} - 4\frac{11}{12}\right)$ (4 marks)

2. Work out as simply as possible

a) $781^2 - 219^2$ (4 marks)

b) $83^2 - (45 \times 83) + (83 \times 62)$ (4 marks)

c) $(53 \times 21) - (19 \times 47) + (32 \times 53) - (47 \times 28)$ (4 marks)

d) $\frac{829^2 - (669 \times 829)}{8.29 \times 80}$ (5 marks)

3. a) Multiply out and simplify

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

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

b) Factorise fully

i) $36a^2 b^4 + 27a^3 b^3$ (3 marks)

ii) $75x^2 - 3y^2$ (3 marks)

iii) $x^2 + 15x + 36$ (3 marks)

c) Simplify

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

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

4. Solve each of these equations for x

a) $12(x - 3) - 2(4x - 5) = 22$ (3 marks)

b) $\frac{5x+1}{6} + \frac{8x+4}{5} = 18$ (4 marks)

c) $(x + 9)(x + 7) - (x + 5)^2 = 62$ (5 marks)

Rearrange the following formula to make x the subject

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

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

a) $9x - 2y = 99$
 $5x - 3y = 38$ (6 marks)

b) $\frac{3}{4}x - \frac{1}{3}y = 12$
 $\frac{5}{6}x + \frac{1}{2}y = 29$ (6 marks)

6. Solve each of these equations for x

a) $x^2 - 13x - 48 = 0$ (4 marks)

b) $14x^2 - 25x + 6 = 0$ (6 marks)

c) $\frac{30}{x+2} + \frac{56}{x-5} = 9$ (8 marks)

Total 100 marks