

RADLEY

Entrance Scholarships

MATHEMATICS I

March 2014

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) 63.2×7.09 (3 marks)
- ii) $59.348 \div 7.4$ (3 marks)
- b) Give the answers to the following as fractions in their simplest form
- i) $\frac{5}{18} + \frac{2}{9}$ (3 marks)
- ii) $4\frac{3}{5} \div 2\frac{7}{8}$ (3 marks)
- iii) $\left(5\frac{1}{7} - 2\frac{5}{11}\right) \times 1\frac{10}{23}$ (4 marks)
2. Work out as simply as possible
- a) $673^2 - 327^2$ (4 marks)
- b) $(57 \times 71) - (71 \times 28) + 71^2$ (4 marks)
- c) $(41 \times 69) - (31 \times 14) + (69 \times 28) - (17 \times 31)$ (4 marks)
- d) $\frac{(597 \times 473) - 473^2}{62 \times 4.73}$ (5 marks)
3. a) Multiply out and simplify
- i) $(x + 3y)^2$ (3 marks)
- ii) $(3a + b)(18a^2 - 6ab + 2b^2)$ (3 marks)
- b) Factorise fully
- i) $21x^2y^3 + 28x^3y$ (3 marks)
- ii) $3a^2 - 48b^2$ (3 marks)
- iii) $x^2 - 9x + 18$ (3 marks)

c) Simplify

i) $\frac{a^2 - 4b^2}{ac + 2bc}$ (3 marks)

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

4. Solve each of these equations for x

a) $8(2x-4) - 3(3x-2) = 23$ (3 marks)

b) $\frac{4x+11}{5} - \frac{x-15}{3} = 10$ (4 marks)

c) $(x+1)(x+4) - (x-3)^2 = 83$ (5 marks)

Rearrange the following formula to make x the subject

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

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

a) $\begin{aligned} 6x + 7y &= 23 \\ 7x + 3y &= 32 \end{aligned}$ (6 marks)

b) $\begin{aligned} \frac{3}{5}x + \frac{5}{6}y &= 33 \\ \frac{2}{3}x - \frac{1}{2}y &= 11 \end{aligned}$ (6 marks)

6. Solve each of these equations for x

a) $x^2 + 5x - 14 = 0$ (4 marks)

b) $6x^2 - 19x + 10 = 0$ (6 marks)

c) $\frac{8}{x-3} + \frac{9}{x-4} = 5$ (8 marks)

Total 100 marks