

RADLEY

Entrance Scholarships

MATHEMATICS I

March 2015

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) 5.83×80.6 (3 marks)
- ii) $459.268 \div 0.76$ (3 marks)
- b) Give the answers to the following as fractions in their simplest form
- i) $\frac{6}{7} - \frac{16}{35}$ (3 marks)
- ii) $4\frac{1}{5} \times 8\frac{3}{7}$ (3 marks)
- iii) $4\frac{9}{10} \div \left(2\frac{3}{5} + 4\frac{3}{4}\right)$ (4 marks)
2. Work out as simply as possible
- a) $584^2 - 416^2$ (4 marks)
- b) $(97 \times 48) + 48^2 - (48 \times 45)$ (4 marks)
- c) $(84 \times 29) + (53 \times 16) + (55 \times 84) - (16 \times 69)$ (4 marks)
- d) $\frac{491^2 + (509 \times 491)}{40 \times 4.91}$ (5 marks)
3. a) Multiply out and simplify
- i) $(x - 4y)^2$ (3 marks)
- ii) $(2a - b)(28a^2 + 14ab + 7b^2)$ (3 marks)
- b) Factorise fully
- i) $15x^2y^3 - 18xy^5$ (3 marks)
- ii) $63a^2 - 28b^2$ (3 marks)
- iii) $x^2 + 3x - 54$ (3 marks)

c) Simplify

i) $\frac{49x^4}{28x^5 + 7x^3}$ (3 marks)

ii) $\left(\frac{x^5}{y^2}\right) \div \left(\frac{x^2}{y^4}\right)$ (3 marks)

4. Solve each of these equations for x

a) $4(2x-7)+9(4x-3)=297$ (3 marks)

b) $\frac{7x+5}{4} - \frac{2x-3}{5} = 14$ (4 marks)

c) $(x-4)^2 - (x+1)(x-8) = 11$ (5 marks)

Rearrange the following formula to make x the subject

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

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

a) $\begin{aligned} 5x-4y &= 47 \\ 6x+5y &= 27 \end{aligned}$ (6 marks)

b) $\begin{aligned} \frac{3}{4}x - \frac{5}{6}y &= 47 \\ \frac{1}{3}x - \frac{3}{5}y &= 14 \end{aligned}$ (6 marks)

6. Solve each of these equations for x

a) $x^2 + 19x + 60 = 0$ (4 marks)

b) $10x^2 + 11x - 8 = 0$ (6 marks)

c) $\frac{80}{x+3} - \frac{5}{x-2} = 7$ (8 marks)

Total 100 marks