

**RADLEY COLLEGE**  
**Entrance Scholarships**



**MATHEMATICS I**

March 2011

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)  $38.5 \times 40.7$  (3 marks)
- ii)  $28.046 \div 0.37$  (3 marks)
- b) Give the answers to the following as fractions in their simplest form
- i)  $\frac{35}{36} - \frac{2}{9}$  (3 marks)
- ii)  $5\frac{1}{4} \div 9\frac{1}{3}$  (3 marks)
- iii)  $4\frac{2}{7} \times \left(5\frac{2}{3} + 1\frac{4}{5}\right)$  (4 marks)
2. Work out as simply as possible
- a)  $587^2 - 413^2$  (4 marks)
- b)  $89^2 - (26 \times 89) + (89 \times 37)$  (4 marks)
- c)  $(39 \times 62) - (38 \times 55) + (62 \times 23) + (17 \times 38)$  (4 marks)
- d)  $\frac{827^2 + (827 \times 173)}{8.27 \times 125}$  (5 marks)
3. a) Multiply out and simplify
- i)  $(x - 4y)^2$  (3 marks)
- ii)  $(x - 2y)(7x^2 + 14xy + 28y^2)$  (3 marks)
- b) Factorise fully
- i)  $15a^3b^2 + 10a^4b$  (3 marks)
- ii)  $28x^2 - 63y^2$  (3 marks)
- iii)  $x^2 - 11x + 28$  (3 marks)

c) Simplify

i)  $\frac{16x^3}{8x^4 - 12x^2}$  (3 marks)

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

4. Solve each of these equations for  $x$

a)  $5(4x + 7) - 3(5 - 2x) = 98$  (3 marks)

b)  $\frac{5x - 4}{3} + \frac{3x + 1}{4} = 11$  (4 marks)

c)  $(x + 4)^2 - (x - 1)(x + 8) = 29$  (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)  $7x - 3y = 37$   
 $4x + 5y = 48$  (6 marks)

b)  $\frac{1}{3}x + \frac{3}{7}y = 17$   
 $\frac{7}{8}x - \frac{2}{3}y = 7$  (6 marks)

6. Solve each of these equations for  $x$

a)  $x^2 - 5x - 24 = 0$  (4 marks)

b)  $2x^2 - 19x + 9 = 0$  (6 marks)

c)  $\frac{15}{x - 2} - \frac{8}{x + 1} = 2$  (8 marks)

**Total 100 marks**