RADLEY

Entrance Scholarships

MATHEMATICS I

March 2017

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. 40.7×82.6 *(3 marks)*

ii. $279.801 \div 0.43$ *(3 marks)*

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

i. $\frac{37}{56} - \frac{2}{7}$ *(3 marks)*

ii. $6\frac{1}{9} \times 7\frac{1}{5}$ *(3 marks)*

iii. $\left(7\frac{3}{4} + 2\frac{2}{3}\right) \div 1\frac{7}{18}$ *(4 marks)*

2 Work out as simply as possible

a. $817^2 - 183^2$ *(4 marks)*

b. $(96 \times 23) - (23 \times 19) + 23^2$ *(4 marks)*

c. $(56 \times 23) + (44 \times 27) - (71 \times 44) + (33 \times 56)$ *(4 marks)*

d. $\dfrac{(629 \times 371) + 371^2}{80 \times 3.71}$ *(5 marks)*

3 a. Multiply out and simplify

i. $(3a-b)^2$ *(3 marks)*

ii. $(x+2y)(4x^2-8xy+16y^2)$ *(3 marks)*

b. Factorise fully

i. $35x^3y^3-14xy^4$ *(3 marks)*

ii. $32a^2-18b^2$ *(3 marks)*

iii. $x^2-5x-24$ *(3 marks)*

c. Simplify

i. $\dfrac{8x^3}{40x^4-24x^2}$ *(3 marks)*

ii. $\dfrac{x^4}{y^2}\div x^2y^2$ *(3 marks)*

4 Solve each of these equations for x

a. $3(5x-8)+7(x-4)=14$ *(3 marks)*

b. $\dfrac{4x+5}{3}-\dfrac{3x-2}{7}=11$ *(4 marks)*

c. $(x+6)^2-(x-1)(x+5)=81$ *(5 marks)*

Rearrange the following formula to make x the subject

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

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

a. $\left.\begin{aligned} 2x+5y&=37\\ 7x+3y&=57\end{aligned}\right\}$ *(6 marks)*

b. $\left.\begin{aligned} \tfrac{2}{5}x+\tfrac{3}{4}y&=13\\ \tfrac{1}{2}x+\tfrac{2}{3}y&=13\end{aligned}\right\}$ *(6 marks)*

6. Solve each of these equations for x

a. $x^2-17x+72=0$ *(4 marks)*

b. $3x^2-5x-12=0$ *(6 marks)*

c. $\dfrac{18}{x-4}-\dfrac{9}{x+2}=5$ *(8 marks)*

Total 100 marks