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

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

4. Solve each of these equations for x

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

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

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

Rearrange the following formula to make x the subject

d) $\dfrac{a}{x-b}=\dfrac{c}{x-d}$ *(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) $\dfrac{8}{x-3}+\dfrac{9}{x-4}=5$ *(8 marks)*

Total 100 marks