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

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

4. Solve each of these equations for x

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

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

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

Rearrange the following formula to make x the subject

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

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

a) $5x-4y=47$
$6x+5y=27$ *(6 marks)*

b) $\dfrac{3}{4}x-\dfrac{5}{6}y=47$
$\dfrac{1}{3}x-\dfrac{3}{5}y=14$ *(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) $\dfrac{80}{x+3}-\dfrac{5}{x-2}=7$ *(8 marks)*

Total 100 marks