RADLEY

13+ Entrance Scholarships

MATHEMATICS 1

30 January 2018

Time allowed – 1 hour

You may try the questions in any order

No calculating aids may be used

Show all working

Total 100 marks

1 a. Work out exactly

i. 3.87×50.7 *(3 marks)*

ii. $234.65 \div 9.5$ *(4 marks)*

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

i. $\frac{17}{36} - \frac{1}{4}$ *(3 marks)*

ii. $4\frac{2}{3} \div \frac{7}{12}$ *(3 marks)*

2 Work out as simply as possible

a. $82^2 - (37 \times 82) + (82 \times 5)$ *(4 marks)*

b. $513^2 - 487^2$ *(4 marks)*

c. $\frac{320^2 - (640 \times 150)}{16^2 \times 5^2}$ *(5 marks)*

3 a. Multiply out and simplify

i. $(3a + 2b)^2$ *(4 marks)*

ii. $(12x^2 + 3xy - 2y^2)(y - x)$ *(4 marks)*

b. Factorise fully

i. $48a^3b^2 - 27a^2b^4$ *(3 marks)*

ii. $48z^4 - 3y^2$ *(3 marks)*

iii. $x^2 + 15x + 54$ *(2 marks)*

c. Simplify

i. $\frac{4y^2-4x^2}{2yz-2xz}$ *(4 marks)*

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

4 Solve each of these equations for *x*

a. $8(x - 3) - 2(x + 3) = 12$ *(3 marks)*

b. $\frac{3x-3}{2} + \frac{3x+2}{5} = 22$ *(4 marks)*

c. $(2x + 6)(x + 3) - (x + 2)^2 = 7$ *(5 marks)*

Rearrange the following formula to make *x* the subject

d. $\frac{4d}{x-b} = \frac{3b}{x-a}$ *(5 marks)*

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

a. $4x - 3y = 13$
$5x - 2y = 25$ *(5 marks)*

b. $\frac{1}{3}x + \frac{1}{2}y = 4$

$\frac{2}{5}x - \frac{1}{4}y = -\frac{3}{10}$ *(6 marks)*

6. Solve each of these equations for x using algebraic methods.

a. $x^2 - 9x - 22 = 0$ *(4 marks)*

b. $4x^2 - 4x - 3 = 0$ *(5 marks)*

c. $\frac{x}{2} + \frac{3}{x-1} = 3$ *(6 marks)*

d. $\frac{42}{x+1} - \frac{20}{x-3} = 1$ *(8 marks)*

Total 100 marks