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

    ii. $4\dfrac{2}{3} \div \dfrac{7}{12}$ *(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. $\dfrac{320^2 - (640 \times 150)}{16^2 \times 5^2}$ *(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. $\dfrac{4y^2 - 4x^2}{2yz - 2xz}$ *(4 marks)*

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

4 Solve each of these equations for x

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

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

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

  Rearrange the following formula to make x the subject

  d. $\dfrac{4d}{x-b} = \dfrac{3b}{x-a}$ *(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