

## Past examination questions for topic 2

### Paper 1

- 1 A problem has an exact answer of  $x = 0.1265$ .
- Write down the exact value of  $x$  in the form  $a \times 10^k$  where  $k$  is an integer and  $1 \leq a < 10$ .
  - State the value of  $x$  given correct to two significant figures.
  - Calculate the percentage error if  $x$  is given correct to two significant figures.

M06q1

- 2 Jacques can buy six CD's and three video cassettes for \$163.17 or he can buy nine CD's and two video cassettes for \$200.53.
- Express this information using two equations relating the price of CD's and the price of video cassettes.
  - Find the price of one video cassette.
  - If Jacques has \$180 to spend find the exact amount of change he will receive if he buys nine CD's.

M06q11

- 3
- The first term of an arithmetic sequence is  $-16$  and the eleventh term is  $39$ . Calculate the value of the common difference.
  - The third term of a geometric sequence is  $12$  and the fifth term is  $\frac{16}{3}$ . All the terms in the sequence are positive. Calculate the value of the common ratio.

N05q13

- 4
- Convert  $0.001\ 673$  litres to millilitres (ml). Give your answer to the nearest ml.

The SI unit for energy is Joule. An object with mass  $m$  travelling at speed  $v$  has energy given by  $\frac{1}{2}mv^2$  (joules).

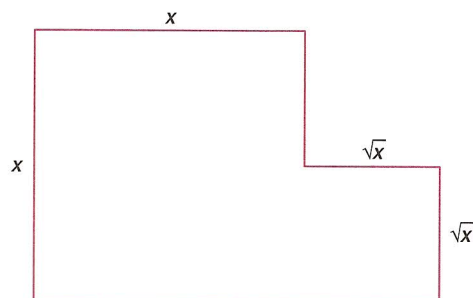
- Calculate the energy of a comet of mass  $351\ 223$  kg travelling at speed  $176.334$  m/s. Give your answer correct to 6 significant figures.

In the SI system of units, distance is measured in metres (m), mass in kilograms (kg) and time in seconds (s). The momentum of an object is given by the mass of the object multiplied by its speed.

- Write down the correct combination of SI units (m, kg, s) for momentum.

M05q4

- 5 A swimming pool is to be built in the shape of a letter L. The shape is formed from two squares with side dimensions  $x$  and  $\sqrt{x}$  as shown.
- Write down an expression for the area,  $A$ , of the swimming pool surface.
  - The area,  $A$ , is to be  $30\text{ m}^2$ . Write a quadratic equation that expresses this information.



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- c Find both the solutions of your equation in part b.
- d Which of the solutions in part c is the correct value of  $x$  for the pool? State briefly why you made this choice.

M05q12

- 6 a Given  $x = 2.6 \times 10^4$  and  $y = 5.0 \times 10^{-8}$ , calculate the value of  $w = x \times y$ . Give your answer in the form  $a \times 10^k$  where  $1 \leq a < 10$  and  $k \in \mathbb{Z}$ .
- b Which two of the following statements about the nature of  $x$ ,  $y$  and  $w$  above are **incorrect**?
  - i  $x \in \mathbb{N}$
  - ii  $y \in \mathbb{Z}$
  - iii  $y \in \mathbb{Q}$
  - iv  $w < y$
  - v  $x + y \in \mathbb{R}$
  - vi  $\frac{1}{w} < x$

M05q14

- 7 In 2000 Herman joined a tennis club. The fees were £1200 a year. Each year the fees increase by 3%.
  - a Calculate, to the nearest £1, the fees in 2002.
  - b Calculate the total fees for Herman who joined the tennis club and remained a member for five years.

N04q7

- 8 Anthony uses the formula

$$p = \frac{27q}{r+s}$$

to calculate the value of  $p$  when, correct to two decimal places,  $q = 0.89$ ,  $r = 1.87$  and  $s = 7.22$ .

- a He estimates the value **without using a calculator**.
    - i Write down the numbers Anthony could use in the formula to estimate the value of  $p$ .
    - ii Work out the estimate for the value of  $p$  that your numbers would give.
  - b A calculator is to be used to work out the actual value of  $p$ . To what degree of accuracy would you give your calculator answer? Give a reason for your answer.
- 9 A woman deposits \$100 into her son's savings account on his first birthday. She deposits \$125 on his second birthday, \$150 on his third birthday, and so on.
    - a How much money would she deposit into her son's account on his 17th birthday?
    - b How much in total would she have deposited after her son's 17th birthday?

N00q14

M99q7