



Candidate Name

Candidate Number

Centre Name

Centre Number


**Paper 1:**

For Examination June 2023

(1 hour 30 minutes)

It is necessary to respond on this question paper. You must have a soft pencil (preferably of type B or HB), a clean eraser and a dark blue or black pen.

**INSTRUCTIONS:**

- You must write your name, candidate number, centre name and centre number in the designated spaces.
- Attempt all the questions using a dark blue or black pen.
- You may use a soft pencil for graphs.
- If working is needed for any question it must be shown below that question.
- Do not use correction fluid.
- Avoid writing on any bar codes.
- You are allowed to use a calculator if needed.

**INFORMATION:**

- This paper has a total of 75 marks.
  - The number of marks assigned for every question or its parts is indicated within brackets [ ].
  - Rough work must be completed on this question paper.
-

1. Show that:

$$5\frac{1}{2} - 2\frac{3}{5} = 2\frac{9}{10}$$

---

**(3 marks)**

2.  $a = 5$     $b = 4.73$     $c = \sqrt{7}$

Work out the value of

$$\frac{b^2 - a}{c^2}.$$

Give your answer correct to 3 significant figures.

---

**(3 marks)**

**3.** Micah wants to borrow £5000 from a bank. She has two options:

**Option 1:** A loan with 5% simple interest per year for 5 years.

**Option 2:** A loan with 4% compound interest per year, compounded annually, for 5 years.

Which loan will cost Micah less in total and by how much?

Give your answer to the nearest pound.

---

**(6 marks)**

4. The perimeter of a triangle is 105 *cm*.

The lengths of the sides of the triangle are in the ratio 4:5:6.

Work out the length of the longest side of the triangle.

---

**(3 marks)**

5. (a) Find the highest common factor of 72 and 90.

---

**(3 marks)**

(b) Find the lowest common multiple of 72 and 90.

---

**(2 marks)**

6. Consider the following sequences:

**A:** 1, 4, 9, 16, 25, ...

**B:** 2, 7, 16, 29, 46 ...

**C:** 3, 6, 12, 24, 48 ...

**D:** 1, 4, 7, 10, 13, ...

**E:** 2, 9, 28, 65, 126, ...

Now match each letter with the **nth Term** of the respective sequence. One of them has been done for you.

Nth Term	$3n - 2$	$3 \cdot 2^{n-1}$	$n^3 + 1$	$2n^2 - n + 1$	$n^2$
Letter		C			

(3 marks)

7.

(a) Write  $6.2 \times 10^4$  as an ordinary number.

---

(1 mark)

(b) Write 0.000027 in standard form.

---

(1 mark)

(c) Work out the value of  $(8.4 \times 10^{12}) \div (4.2 \times 10^4)$

---

(2 marks)

8. A bag contains only purple pencils, green pencils, yellow pencils and red pencils. The table gives the probabilities that, when a pencil is taken at random from the bag, the pencil will be purple or the pencil will be green.

Pencil	purple	green	yellow	red
Probability	0.27	0.13		

The ratio

number of yellow pencils : number of red pencils = 3:1

There are 60 pencils in the bag.

(a) Work out the number of red pencils in the bag.

(b) Complete the table.

(5 marks)

**9. (a)** Factorise the following:

**(i)**  $4x + 20y$

---

**(1 mark)**

**(ii)**  $x^2 + 5x + 6$

---

**(2 marks)**

**(iii)**  $9x^2 - 16$

---

**(2 marks)**

**(b)** Solve by Factorising:

$$3x^2 + 7x + 2 = 0$$

---

**(3 marks)**

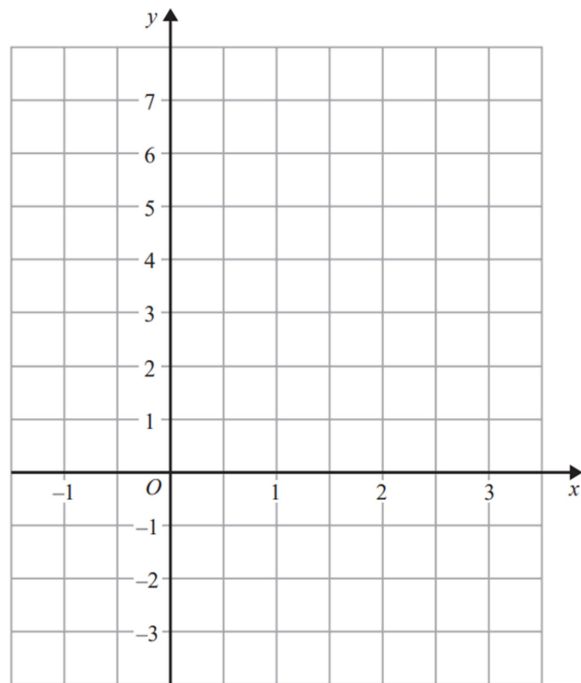
**(c)** Solve by using the quadratic formula. Give your answers to 2 decimal places.

$$5x^2 + 2x - 1 = 0$$

---

**(3 marks)**

**10. (a)** On the grid, draw the graph of  $y = 5 - 2x$  for values of  $x$ , from  $-1$  to  $3$ .



---

**(3 marks)**

**(b)** Write down the coordinates of the point where the graph of  $y = 5 - 2x$  crosses the line  $y = 3$ .

---

**(1 mark)**

---



11. Solve the following simultaneous equations:

$$3x + 2y = 12$$

$$2x - y = 3$$

---

**(5 marks)**

**12** (a) The number 49 is rounded to 2 significant figures.

(i) Write down the lower bound of 49.

---

**(1 mark)**

(ii) Write down the upper bound of 49.

---

**(1 mark)**

(b) Correct to 2 significant figures,  $w = 49$ ,  $x = 27$  and  $y = 16$ .

Calculate the upper bound of

$$\frac{w}{x - y}$$

---

**(4 mark)**

**13. (a)** Simplify the following

**(i)**  $y^0$

---

**(1 mark)**

**(ii)**  $\frac{y^2 \times y^5}{y^3}$

---

**(2 marks)**

**(iii)**  $\left(\frac{1}{(2y)^2}\right)^{-2}$

---

**(3 marks)**

**(b)** Solve for  $x$

$$3^{x+2} = 9^{x-1}$$

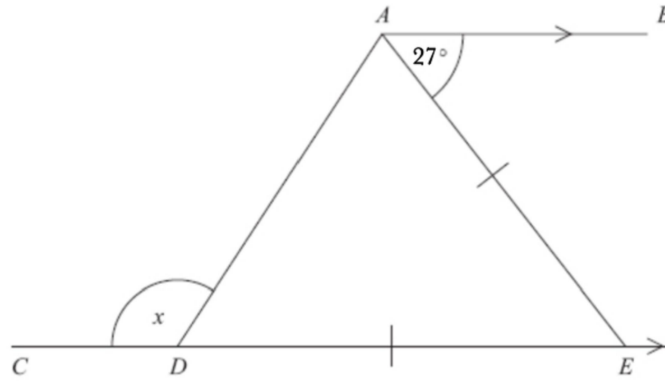
---

**(4 marks)**

**14.**  $CDE$  is a straight line.

$AB$  is parallel to  $CE$ .

$DE = AE$ .



(a) Write down the value of the angle AED

---

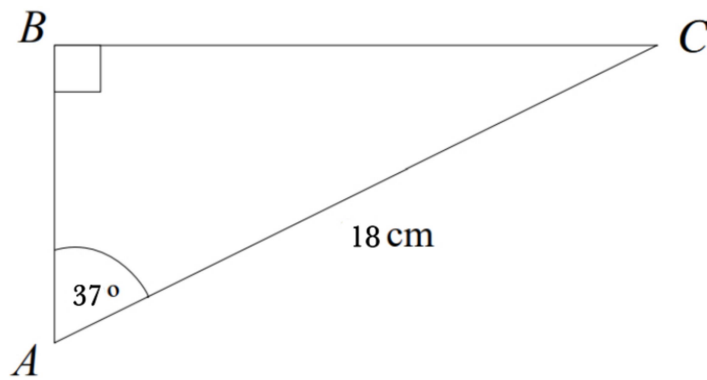
(1 mark)

(b) Work out angle ADC, the angle marked  $x$ .

---

(2 marks)

**15.** Triangle  $ABC$  is a right-angled triangle.



(a) Find the length of  $AB$ . Give your answer to 1 decimal place.

---

**(2 marks)**

(b) Find the length of  $BC$ . Give your answer to 1 decimal place.

---

**(2 marks)**

---