NON-CALC B

# GCSE Mathematics · Higher Tier

40 marks · 45 minutes · Non-calculator

**Name** ..... **Class** .....

**Answer all questions. Show all your working. Diagrams are NOT accurately drawn unless stated.**

**1** Work out $2\frac{2}{3} \div 1\frac{1}{9}$

Give your answer as a mixed number in its simplest form.

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**(Total for Question 1 is 3 marks)**

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**2** In a sale, all normal prices are reduced by 15%.

Priya buys a bike in the sale. She pays £340

Priya says,

*"15% of £340 is £51, so I have saved £51."*

Is Priya correct? You must show how you get your answer.

**(Total for Question 2 is 3 marks)**

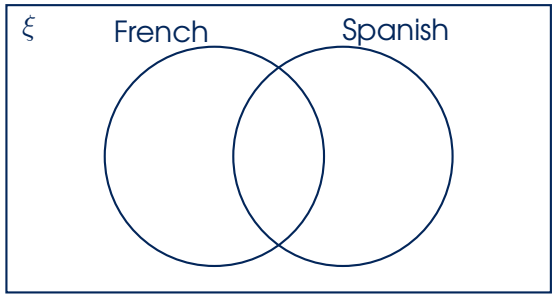
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**3** There are 50 students in a club.

28 of the students study French. 19 of the students study Spanish.

7 of the students study both French and Spanish.

**(a)** Complete the Venn diagram to show this information.




**(2)**

**(b)** One of the 50 students is chosen at random.

Work out the probability that this student studies exactly one of these languages.

.....

**(2)**

**(Total for Question 3 is 4 marks)**

**4** Here are the first five terms of an arithmetic sequence.

5 11 17 23 29

**(a)** Find an expression, in terms of $n$, for the $n$th term of the sequence.

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**(2)**

**(b)** Is 100 a term in this sequence? You must give a reason for your answer.

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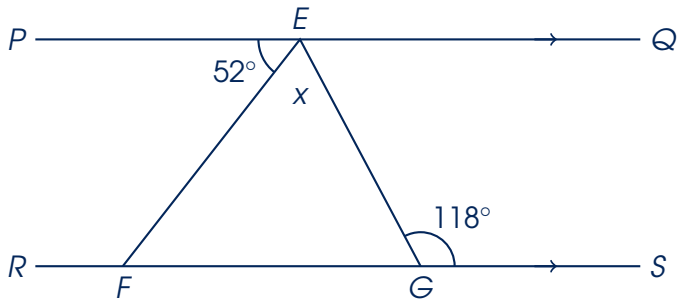
**(2)**

**(Total for Question 4 is 4 marks)**

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**5** $PQ$ and $RS$ are parallel straight lines.

$E$ is a point on $PQ$. $F$ and $G$ are points on $RS$.




Work out the size of the angle marked $x$.

Give a reason for each stage of your working.

$x =$ .....

**(Total for Question 5 is 3 marks)**

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**6** Work out $(3.2 \times 10^7) \div (8 \times 10^{-3})$

Give your answer in standard form.

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**(Total for Question 6 is 2 marks)**

**7** Expand and simplify $(x+2)(x-3)(2x+1)$

.....

**(Total for Question 7 is 3 marks)**

**8** $y$ is directly proportional to the square of $x$.

When $x = 4$, $y = 48$

**(a)** Work out the value of $y$ when $x = 5$

$y =$ .....

**(3)**

**(b)** The value of $x$ is increased by 50%.

Work out the percentage increase in the value of $y$.

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**(2)**

**(Total for Question 8 is 5 marks)**

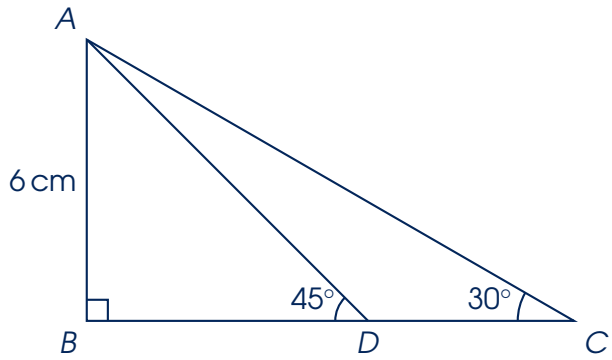
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**9** Prove algebraically that the recurring decimal $0.1\dot{5}$ can be written as $\frac{7}{45}$

**(Total for Question 9 is 2 marks)**

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**10** $ABC$ is a right-angled triangle. $D$ is the point on $BC$ such that angle $ADB = 45°$
$AB = 6$ cm. Angle $ACB = 30°$



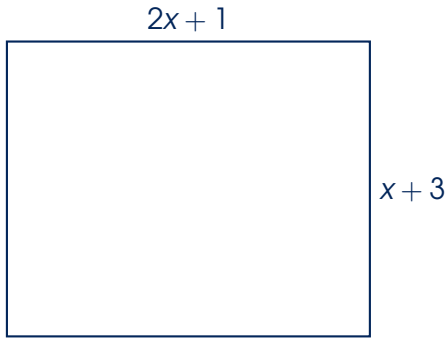

Work out the exact length of $DC$.
Give your answer in the form $a\sqrt{3} + b$, where $a$ and $b$ are integers.

.....

**(Total for Question 10 is 3 marks)**

**11** The diagram shows a rectangle.

All measurements are in centimetres.




The area of the rectangle is 52 cm$^2$.

**(a)** Show that $2x^2 + 7x - 49 = 0$

**(2)**

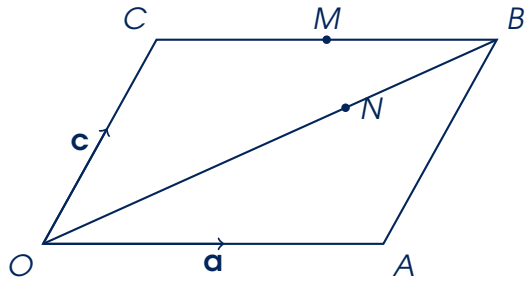
**(b)** Work out the perimeter of the rectangle.

.....

**(3)**

**(Total for Question 11 is 5 marks)**

**12** $OABC$ is a parallelogram.




$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$

$M$ is the midpoint of $CB$.

$N$ is the point on $OB$ such that $ON : NB = 2 : 1$

Prove that $A$, $N$ and $M$ lie on a straight line.

**(Total for Question 12 is 3 marks)**

**TOTAL FOR PAPER IS 40 MARKS**