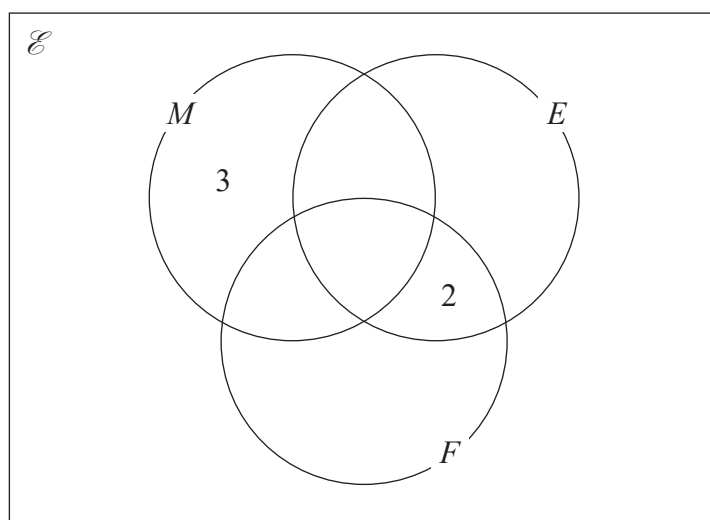


16 There are 32 students in a class.

In one term these 32 students each took a test in Maths ( $M$ ), in English ( $E$ ) and in French ( $F$ ).

- 25 students passed the test in Maths.
- 20 students passed the test in English.
- 14 students passed the test in French.
- 18 students passed the tests in Maths and English.
- 11 students passed the tests in Maths and French.
- 4 students failed all three tests.
- $x$  students passed all three tests.

The incomplete Venn diagram gives some more information about the results of the 32 students.



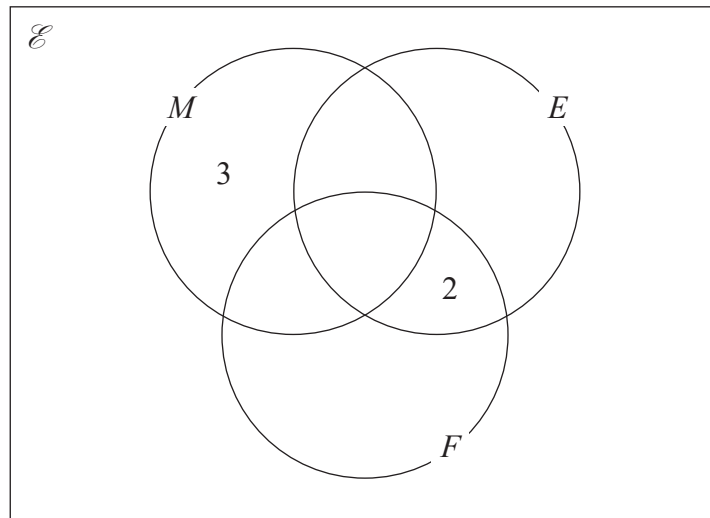
- (a) Use all the given information about the results of students who passed the test in Maths to find the value of  $x$ .

$$x = \dots\dots\dots$$

(2)



- (b) Use your value of  $x$  to complete the Venn diagram to show the number of students in each subset.



(2)

A student who passed the test in Maths is chosen at random.

- (c) Find the probability that this student failed the test in French.

.....  
(1)

(Total for Question 16 is 5 marks)



17 (a) Factorise  $6y^2 - y - 5$

.....  
(2)

(b) Make  $f$  the subject of  $w = \frac{2f + 3}{8 - f}$

.....  
(3)

(c) Express  $4x^2 - 8x + 7$  in the form  $a(x + b)^2 + c$  where  $a$ ,  $b$  and  $c$  are integers.

.....  
(3)

(Total for Question 17 is 8 marks)

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18  $0.4\dot{x}$  is a recurring decimal.  
 $x$  is a whole number such that  $1 \leq x \leq 9$

Find, in terms of  $x$ , the recurring decimal  $0.4\dot{x}$  as a fraction.  
Give your fraction in its simplest form.  
Show clear algebraic working.

.....  
(Total for Question 18 is 3 marks)



19  $ABCED$  is a five-sided shape.

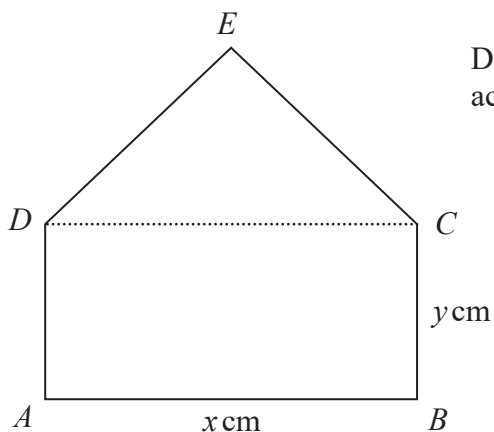


Diagram **NOT**  
accurately drawn

$ABCD$  is a rectangle.

$CED$  is an equilateral triangle.

$$AB = x \text{ cm} \quad BC = y \text{ cm}$$

The perimeter of  $ABCED$  is 100 cm.

The area of  $ABCED$  is  $R \text{ cm}^2$

(a) Show that  $R = \frac{x}{4} (200 - [6 - \sqrt{3}]x)$

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(3)



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(b) (i) Find the value of  $x$  for which  $R$  has its maximum value.

Give your answer in the form  $\frac{p}{q - \sqrt{3}}$  where  $p$  and  $q$  are integers.

$x = \dots\dots\dots$   
(2)

(ii) Explain why the maximum value of  $R$  is given by this value of  $x$ .

.....  
.....  
.....  
(1)

(Total for Question 19 is 6 marks)

Turn over for Question 20



- 20 The straight line **L** passes through point  $A(-6, 2)$  and point  $B(5, 3)$   
The straight line **M** is perpendicular to **L** and passes through the midpoint of  $A$  and  $B$ .  
The line **M** intersects the line  $x = -1$  at point  $C$ .

Calculate the area of triangle  $ABC$ .

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.....  
(Total for Question 20 is 7 marks)

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TOTAL FOR PAPER IS 100 MARKS

