

Write your name here	
Surname	Other names
Pearson Edexcel	Centre Number
Level 1/Level 2 GCSE (9-1)	Candidate Number
<h1 style="margin: 0;">Mathematics</h1> <h2 style="margin: 0;">Paper 3 (Calculator)</h2> <h3 style="margin: 0;">Aiming for 7</h3> <div style="float: right; text-align: right;"> <h3 style="margin: 0;">Higher Tier</h3> </div>	
Spring 2023 Practice Paper	Paper Reference
Time: 1 hour 30 minutes	1MA1/3H
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 80. There are 25 questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by students achieving Grade 7 in the Summer and November 2022 examinations.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

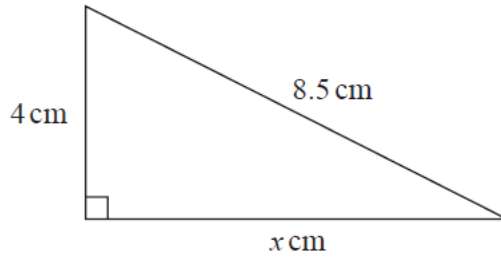
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a right-angled triangle.

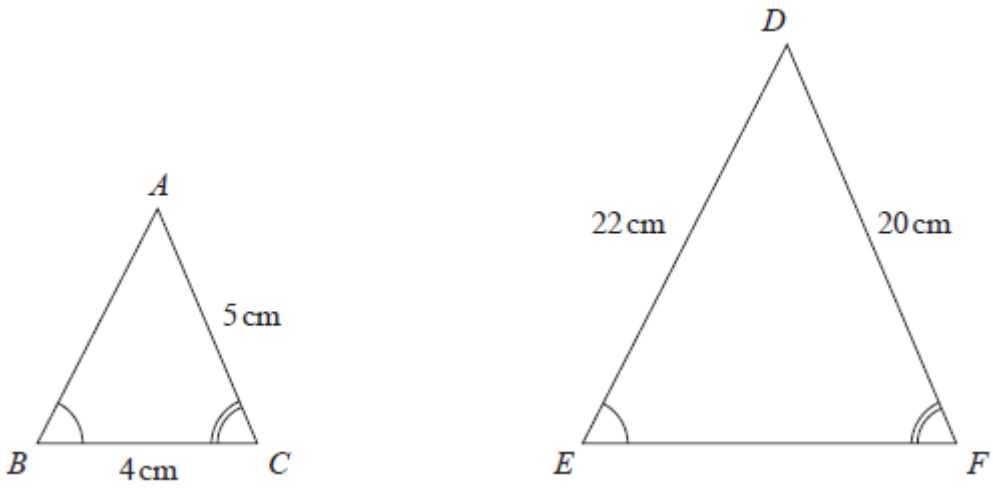


Work out the value of x .

$x = \dots\dots\dots$

(Total for Question 1 is 2 marks)

2 Triangle ABC and triangle DEF are similar.



(a) Work out the length of EF .

..... cm
(2)

(b) Work out the length of AB .

..... cm
(2)

(Total for Question 2 is 4 marks)

3 Jo is going to buy 15 rolls of wallpaper.

Here is some information about the cost of rolls of wallpaper from each of two shops.

<p style="text-align: center;">Chic Decor</p> <p style="text-align: center;">3 rolls for £36</p>

<p style="text-align: center;">Style Papers</p> <p style="text-align: center;">Pack of 5 rolls normal price £70</p> <p style="text-align: center;">12% off the normal price</p>
--

Jo wants to buy the 15 rolls of wallpaper as cheaply as possible.

Should Jo buy the wallpaper from Chic Decor or from Style Papers?

You must show how you get your answer.

(Total for Question 3 is 4 marks)

4 Rick, Selma and Tony are playing a game with counters.

Rick has some counters.

Selma has twice as many counters as Rick.

Tony has 6 counters less than Selma.

In total they have 54 counters.

the number of counters Rick has : the number of counters Tony has = $1 : p$

Work out the value of p .

$p = \dots\dots\dots$

(Total for Question 4 is 5 marks)

5 $T = 4m^2 - 11$

(a) Work out the value of T when $m = -3$

$T = \dots\dots\dots$
(2)

(b) Make p the subject of the formula $d = 3p + 4$

$\dots\dots\dots$
(2)

(Total for Question 5 is 4 marks)

6 Rayheem has

- 16 shirts
- 5 pairs of jeans
- 3 jackets

Rayheem chooses an outfit to wear.

An outfit is 1 shirt, 1 pair of jeans and 1 jacket.

Work out how many different outfits Rayheem can choose.

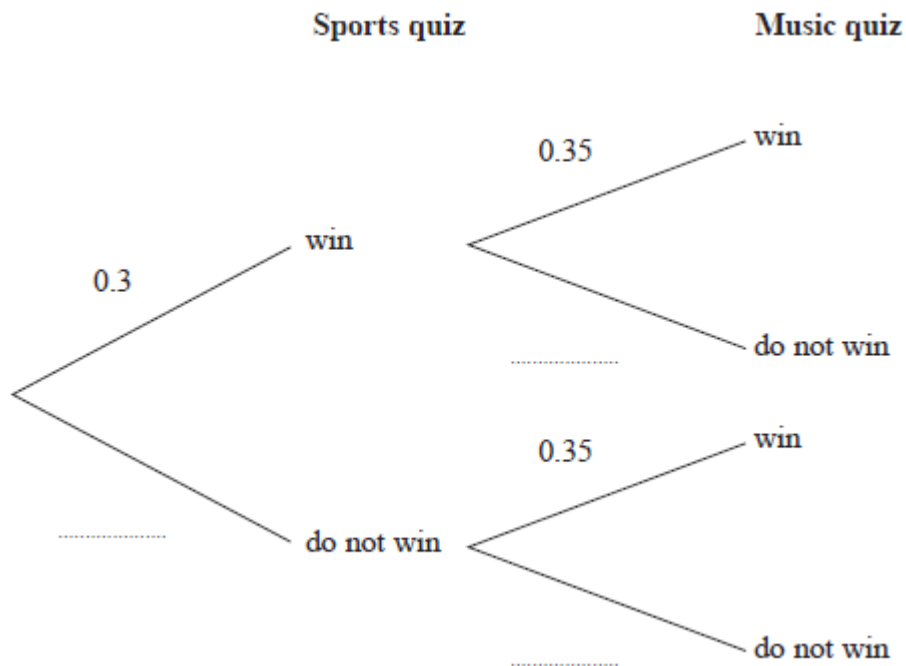
$\dots\dots\dots$
(Total for Question 6 is 2 marks)

7 One weekend the Keddie family is going to do a sports quiz and a music quiz.

The probability that the family will win the sports quiz is 0.3

The probability that the family will win the music quiz is 0.35

(a) Complete the probability tree diagram.



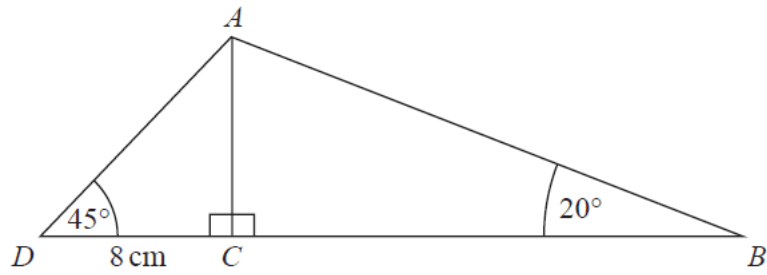
(2)

(b) Work out the probability that the Keddie family will win both the sports quiz and the music quiz.

.....
(2)

(Total for Question 7 is 4 marks)

8 ABC and ACD are right-angled triangles.



$DC = 8 \text{ cm}$

Angle $ADC = 45^\circ$

Angle $ABC = 20^\circ$

Work out the length of AB .

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 8 is 3 marks)

9 (a) Write 6.75×10^{-4} as an ordinary number.

.....
(1)

(b) Work out $\frac{2.56 \times 10^6 \times 4.12 \times 10^{-3}}{1.6 \times 10^{-2}}$

Give your answer in standard form.

.....
(2)

(Total for Question 9 is 3 marks)

10 Make a the subject of the formula $p = 3a - 9$

.....
(Total for Question 10 is 2 marks)

11 A pet shop has

7 guppy fish

13 tetra fish

5 angel fish.

David is going to choose one of the following combinations of fish

a guppy fish and an angel fish

or a tetra fish and an angel fish

or a guppy fish, a tetra fish and an angel fish.

Show that there are 555 different ways for David to choose his fish.

(Total for Question 11 is 2 marks)

- 12** 200 students chose one language to study.
Each student chose one language from French or Spanish or German.

Of the 200 students,

90 are boys and the rest of the students are girls
70 chose Spanish
60 of the 104 students who chose French are boys
18 girls chose German.

Work out how many boys chose Spanish.

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

13 (a) Simplify fully $(3x^5y^6)^4$

.....
(2)

(b) Expand and simplify $(x + 2)(x - 3)(x + 4)$

.....
(3)

(Total for Question 13 is 5 marks)

- 14** Jessica runs for 15 minutes at an average speed of 6 miles per hour.
She then runs for 40 minutes at an average speed of 9 miles per hour.
It takes Amy 45 minutes to run the same total distance that Jessica runs.
Work out Amy's average speed.
Give your answer in miles per hour.

..... miles per hour
(Total for Question 14 is 4 marks)

- 15** Rob has been asked to divide 120 in the ratio 3 : 5

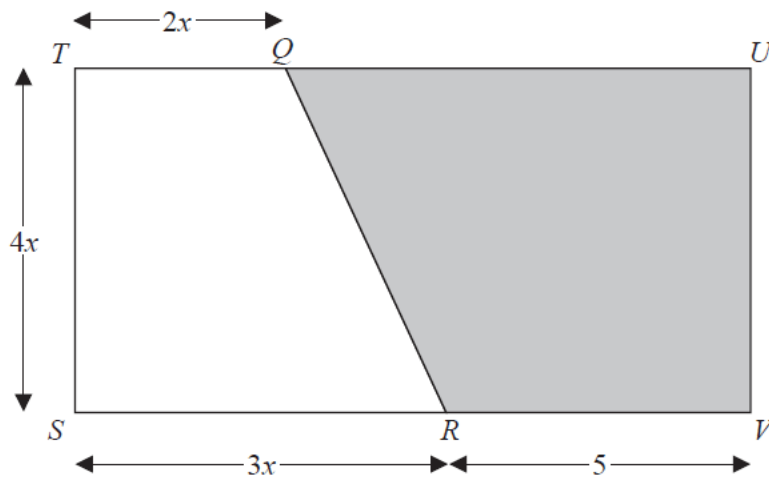
Here is his working.

$$120 \div 3 = 40 \quad 120 \div 5 = 24$$

Rob's working is not correct.
Describe what Rob has done wrong.

.....
.....
(Total for Question 15 is 1 mark)

- 16 The diagram shows rectangle $STUV$.
 TQU and SRV are straight lines.
All measurements are in cm.



The area of trapezium $QUVR$ is $A \text{ cm}^2$

Show that $A = 2x^2 + 20x$

(Total for Question 16 is 3 marks)

17 **a** and **b** are vectors such that

Find **b** as a column vector.

$$\begin{pmatrix} \\ \\ \end{pmatrix}$$

(Total for Question 17 is 3 marks)

18 $p = \sqrt{\frac{2e}{f}}$

$e = 6.8$ correct to 1 decimal place.

$f = 0.05$ correct to 1 significant figure.

Work out the upper bound for the value of p .
Give your answer correct to 3 significant figures.
You must show all your working.

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

19 x and y are integers such that

$$3 < x < 8$$

$$4 < y < 10$$

and $x + y = 14$

Find all the possible values of x .

.....
(Total for Question 19 is 2 marks)

20 (a) Factorise fully $4p^2 - 36$

.....
(2)

(b) Show that $(m + 4)(2m - 5)(3m + 1)$ can be written in the form $am^3 + bm^2 + cm + d$ where a, b, c and d are integers.

(3)

(Total for Question 20 is 5 marks)

21 There are 30 women and 20 men at a gym.

The mean height of all 50 people is 167.6 cm

The mean height of the 20 men is 182 cm

Work out the mean height of the 30 women.

..... cm

(Total for Question 21 is 3 marks)

22 Peter has to subtract $(x^2 - 2x - 4)$ from $(x^2 + 3x + 5)$

Here is his working

$$\begin{aligned}(x^2 + 3x + 5) - (x^2 - 2x - 4) \\ = x^2 + 3x + 5 - x^2 - 2x - 4 \\ = x + 1\end{aligned}$$

Explain what is wrong with Peter's working.

.....
.....
.....

(Total for Question 22 is 1 mark)

23 (a) Express $\sqrt{\frac{10^{360}}{10^{150} \times 10^{90}}}$ as a power of 10

.....
(3)

Liam was asked to express $(12^{50})^2$ as a power of 12

Liam wrote $(12^{50})^2 = 12^{50^2} = 12^{2500}$

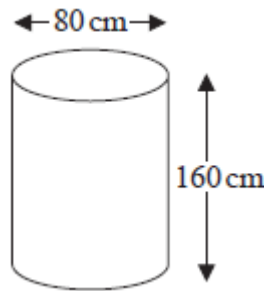
Liam's method is wrong.

(b) Explain why.

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

(Total for Question 23 is 4 marks)

- 24 Karina has 4 tanks on her tractor.
Each tank is a cylinder with diameter 80 cm and height 160 cm.



The 4 tanks are to be filled completely with a mixture of fertiliser and water.
The fertiliser has to be mixed with water in the ratio 1 : 100 by volume.

Karina has 32 litres of fertiliser.
1 litre = 1000 cm³

Has Karina enough fertiliser for the 4 tanks?
You must show how you get your answer.

(Total for Question 24 is 4 marks)

25 (a) Change 8000 cm^3 to m^3

..... m^3
(1)

(b) Change a speed of 180 km per hour to metres per second.

..... metres per second
(3)

(Total for Question 25 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS