

Write your name here:

Surname:	Other Names:
----------	--------------

# Mathematics

## Practice Papers Set 1

### Paper 3 (Calculator)

### Higher Tier

## Time: 1 hour 30 minutes

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser

#### 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.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

#### Information

- The total mark for this paper is 80
- 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.

- 1 The table shows information about the mark scored on an examination question by each of 40 students.

Work out the mean mark.

Mark	Number of students
0	13
1	2
2	3
3	8
4	14

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

2 Here is a list of ingredients for making 18 mince pies.

**Ingredients for 18 mince pies**

225 g of butter  
350 g of flour  
100 g of sugar  
280 g of mincemeat  
1 egg

Elaine wants to make 45 mince pies.

Elaine has

1 kg of butter  
1 kg of flour  
500 g of sugar  
600 g of mincemeat  
6 eggs

Does Elaine have enough of each ingredient to make 45 mince pies?  
You must show clearly how you got your answer.

---

**(Total for Question 2 is 4 marks)**

3 The diagram shows the plan of a playground.

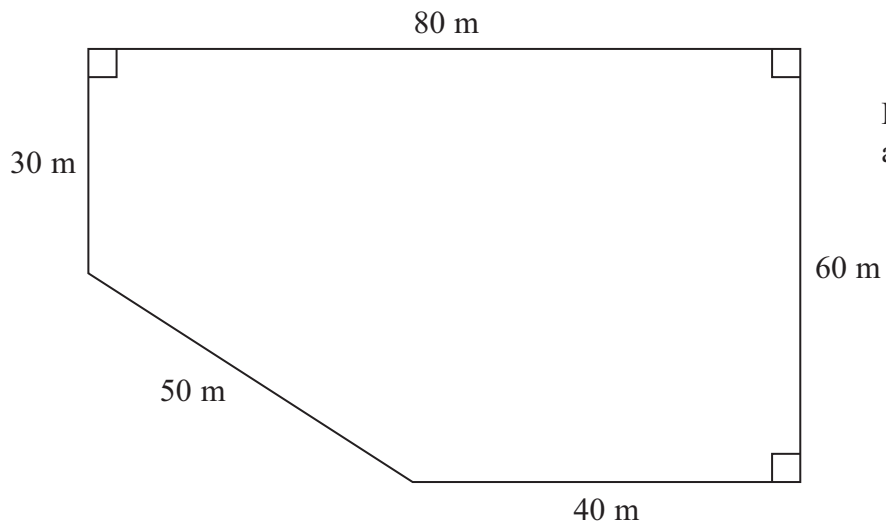


Diagram **NOT** accurately drawn

Bill is going to cover the playground with tarmac.  
It costs £2.56 to cover each square metre with tarmac.

Work out the total cost of the tarmac Bill needs.

£ .....

(Total for Question 3 is 4 marks)

4 Rhiana plays a game.

The probability that she will lose the game is 0.32

The probability that she will draw the game is 0.05

Rhiana is going to play the game 200 times.

Work out an estimate for the number of times Rhiana will win the game.

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

---

5 (a) Show that  $\frac{7}{8} - \frac{5}{6} = \frac{1}{24}$

(2)

(b) Show that  $\frac{5}{8} \div \frac{7}{12} = 1\frac{1}{14}$

(2)

---

**(Total for Question 5 is 4 marks)**

- 6 Harry goes to a restaurant, he is going to have a starter, a main and a dessert.  
There are 3 starters, 5 mains and 4 desserts on the menu.

How many different combinations of starters, mains and desserts could Harry choose?

.....

---

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

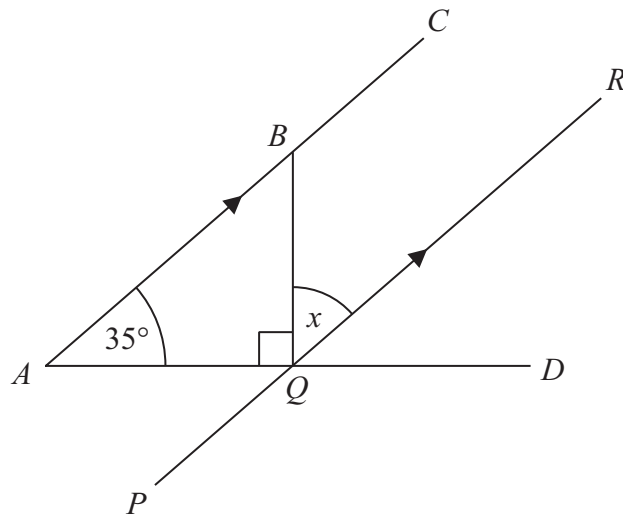


Diagram **NOT**  
accurately drawn

$ABC$ ,  $PQR$  and  $AQD$  are straight lines.  
 $ABC$  is parallel to  $PQR$ .

Angle  $BAQ = 35^\circ$   
Angle  $BQA = 90^\circ$

Work out the size of the angle marked  $x$ .  
Give reasons for each stage of your working.

$x =$  .....

(Total for Question 7 is 4 marks)

8  $XYZ$  is a right-angled triangle.

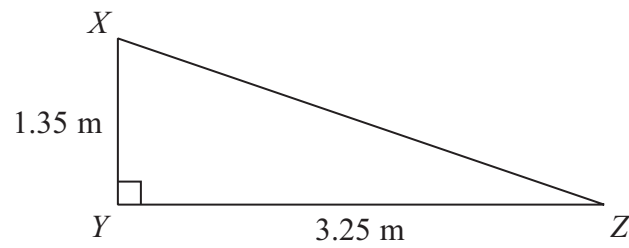


Diagram **NOT** accurately drawn

Calculate the length of  $XZ$ .  
Give your answer correct to 3 significant figures.

..... m

(Total for Question 8 is 3 marks)



9 The diagram shows an incomplete regular polygon.

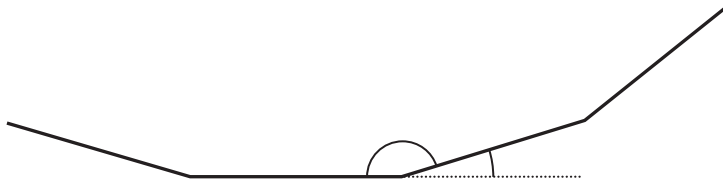


Diagram **NOT**  
accurately drawn

The size of each interior angle is 140 degrees greater than the size of each exterior angle.

Work out the number of sides the regular polygon has.

.....  
**(Total for Question 9 is 4 marks)**

---

10

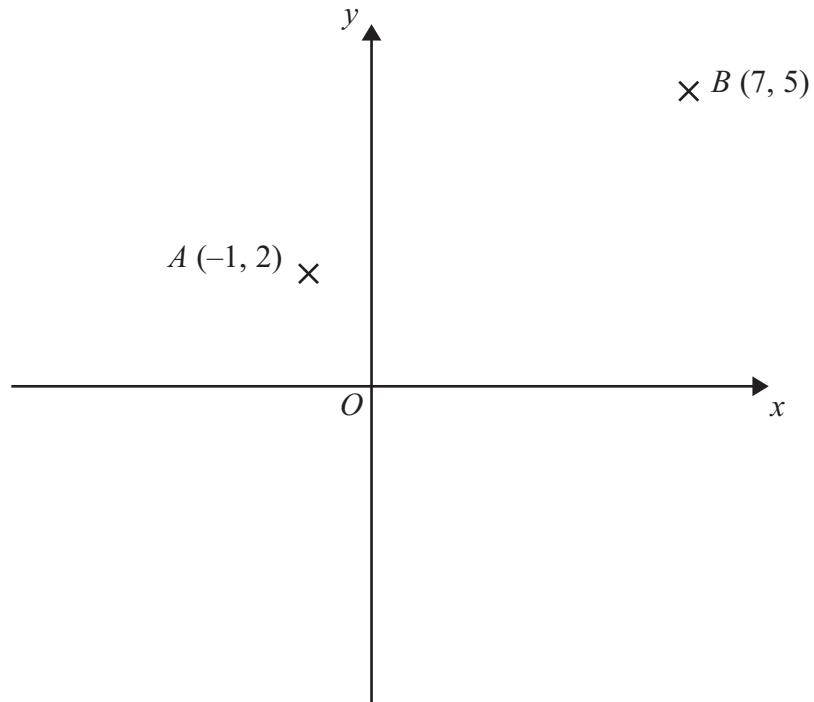


Diagram **NOT**  
accurately drawn

$A$  is the point  $(-1, 2)$

$B$  is the point  $(7, 5)$

(a) Find the coordinates of the midpoint of  $AB$ .

(....., .....)  
(2)

$P$  is the point  $(-4, 4)$

$Q$  is the point  $(1, -5)$

(b) Find the gradient of  $PQ$ .

.....  
(2)

**(Total for Question 10 is 4 marks)**

**11** Viv wants to invest £2000 for 2 years in the same bank.

**The International Bank**

Compound Interest

4% for the first year

1% for each extra year

**The Friendly Bank**

Compound Interest

5% for the first year

0.5% for each extra year

At the end of 2 years, Viv wants to have as much money as possible.

Which bank should she invest her £2000 in?

---

**(Total for Question 11 is 4 marks)**

12 The table shows the surface areas, in  $\text{km}^2$ , of five oceans.

Ocean	Surface area ( $\text{km}^2$ )
Atlantic	$7.68 \times 10^7$
Indian	$6.86 \times 10^7$
Pacific	$1.56 \times 10^8$
Southern	$2.03 \times 10^7$
Arctic	$1.41 \times 10^7$

(a) Which of these oceans has the largest surface area?

.....  
(1)

(b) Work out the total surface area, in  $\text{km}^2$ , of all five oceans.  
Give your answer in standard form.

.....  $\text{km}^2$   
(2)

The total surface area of the Earth is  $5.10 \times 10^8 \text{ km}^2$ .

(c) Express the total surface area of the five oceans as a percentage of the total surface area of the Earth.  
Give your answer correct to 1 decimal place.

..... %  
(2)

**(Total for Question 12 is 5 marks)**

**13** The pressure  $P$ , of water leaving a cylindrical pipe, is inversely proportional to the square of the radius,  $r$ , of the pipe.

$$P = 22.5 \text{ when } r = 2$$

(a) Find a formula for  $P$  in terms of  $r$ .

.....  
(3)

(b) Calculate the value of  $P$  when  $r = 1.5$

$P =$  .....  
(1)

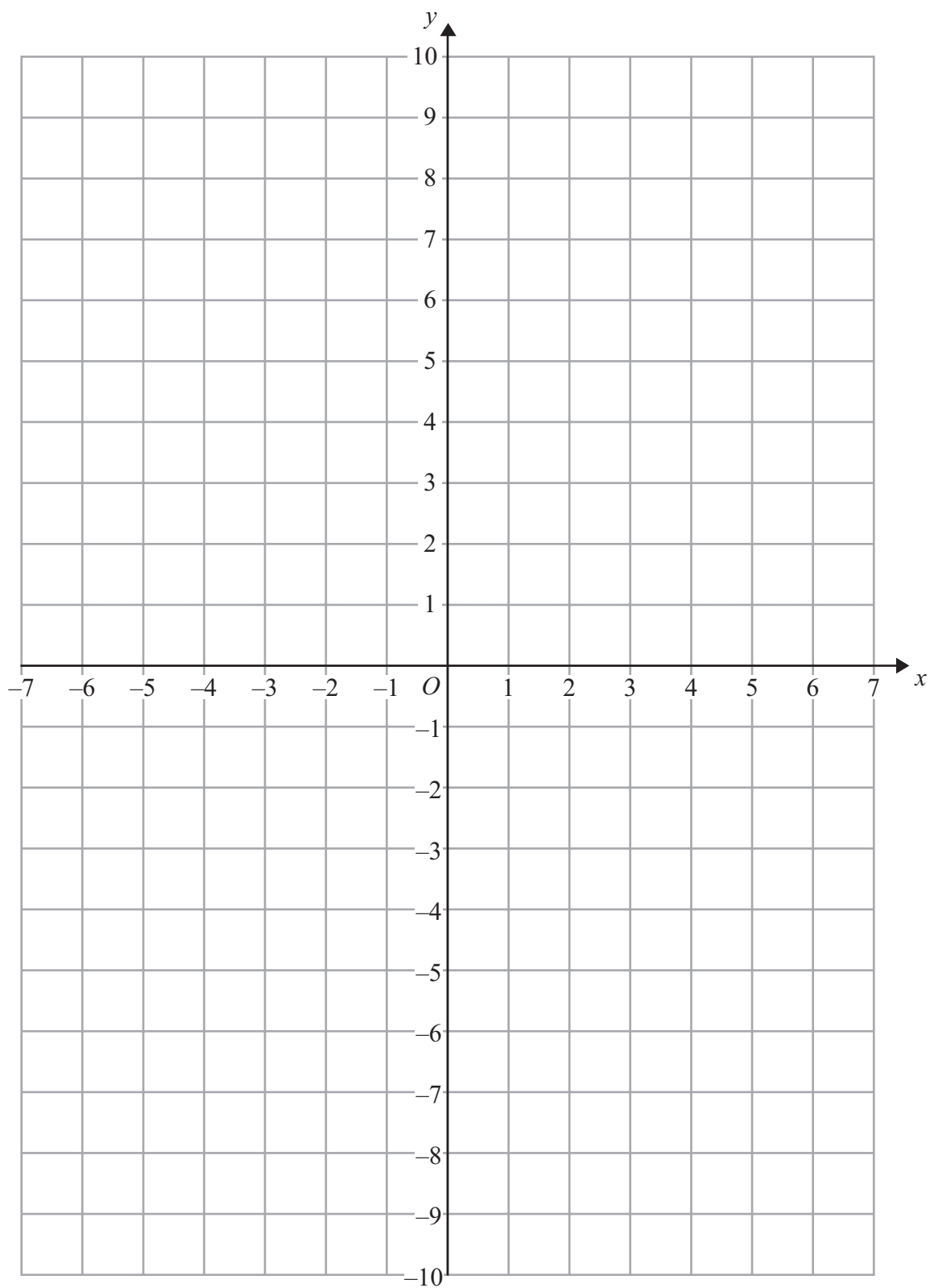
(c) Calculate the value of  $r$  when  $P = 10$

$r =$  .....  
(2)

---

**(Total for Question 13 is 6 marks)**

14 (a) On the grid, construct the graph of  $x^2 + y^2 = 25$



(b) Find the number of points of intersection of the curve  $y = 9 - x^2$  and  $x^2 + y^2 = 25$   
Show clearly how you get your answer.

(2)

---

**(Total for Question 14 is 4 marks)**

**15** Charles asked 100 people which of the films Ghost, Titanic and Shrek they have watched.

Here is some information about his results.

55 had watched Ghost.

58 had watched Titanic.

60 had watched Shrek.

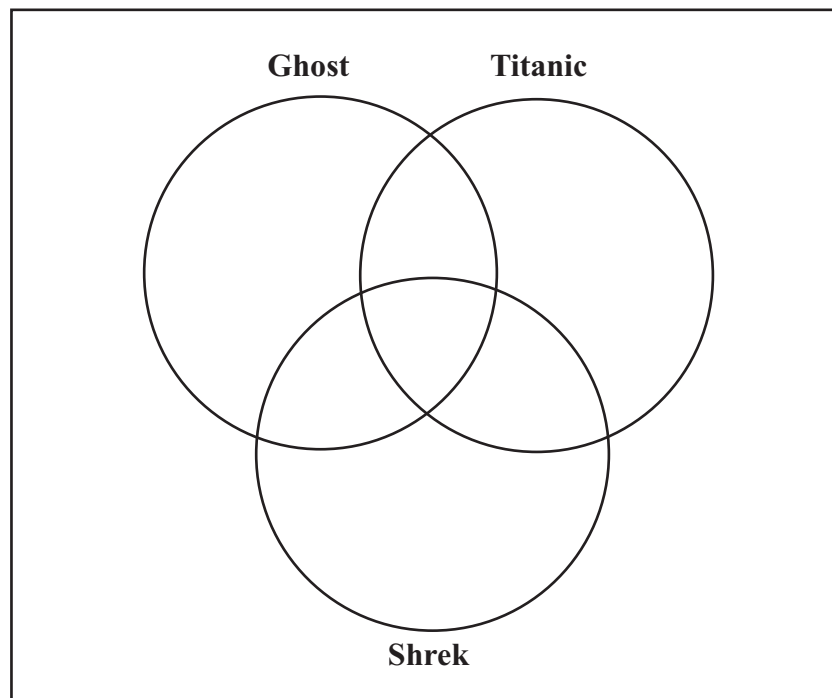
36 had watched Ghost and Shrek.

35 had watched Ghost and Titanic.

37 had watched Titanic and Shrek.

20 had watched all three films.

(a) Complete the Venn diagram for this information.



(4)

Charles is going to pick at random one of these 100 people.

Given that the person had watched Titanic,

(b) work out the probability that the person had also watched Ghost.

.....  
(2)

**(Total for Question 15 is 6 marks)**



16

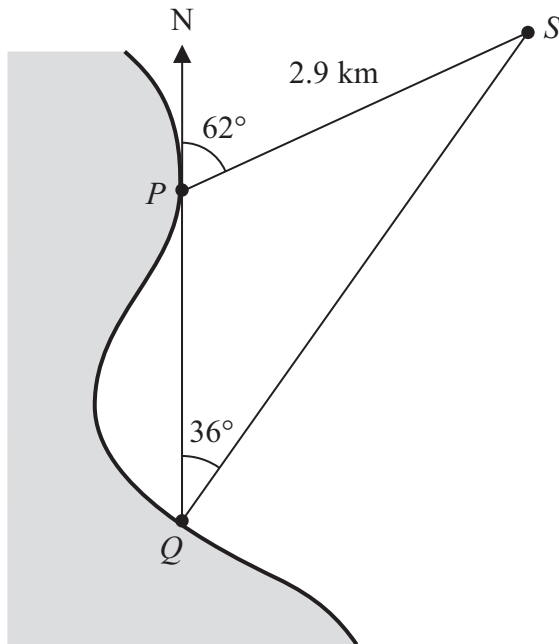


Diagram **NOT**  
accurately drawn

$P$  and  $Q$  are two points on a coast.

$P$  is due North of  $Q$ .

A ship is at the point  $S$ .

$PS = 2.9$  km.

The bearing of the ship from  $P$  is  $062^\circ$

The bearing of the ship from  $Q$  is  $036^\circ$

Calculate the distance  $QS$ .

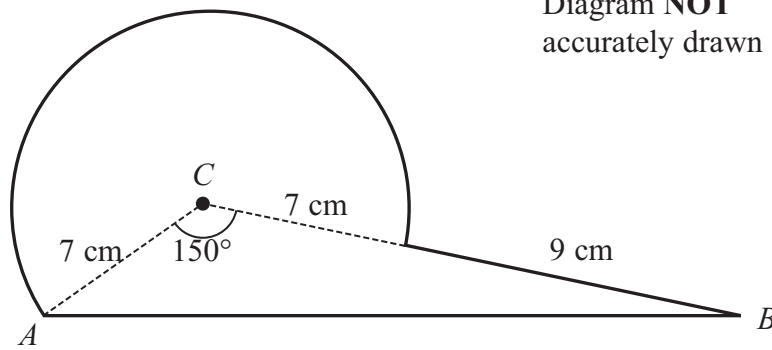
Give your answer correct to 3 significant figures.

..... km

(Total for Question 16 is 3 marks)

17 Here is a shape.

Diagram **NOT**  
accurately drawn



The shape is made from triangle  $ABC$  and a sector of a circle, centre  $C$  and radius  $CA$ .  
 $CA = 7$  cm.  
 $CB = 16$  cm.  
Angle  $ACB = 150^\circ$

Calculate the area of the shape.  
Give your answer correct to 3 significant figures.

..... cm<sup>2</sup>

(Total for Question 17 is 6 marks)

18 Solve the simultaneous equations  $x^2 + y^2 = 9$   
 $x + y = 2$

Give your answers correct to 2 decimal places.

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

or  $x = \dots\dots\dots y = \dots\dots\dots$

---

**(Total for Question 18 is 6 marks)**

19 Solve  $\frac{3}{(x+1)} + \frac{2}{(2x-3)} = 1$

Show clear algebraic working.

---

(Total for Question 19 is 5 marks)