

# General Certificate of Secondary Education

## GCSE AQA Mathematics (Grade 9-1) Higher Tier

Centre name				
Centre number				
Candidate number				

### Practice Set 2 Paper 1: Non-calculator

Time allowed: 1 hour 30 minutes

Surname
Other names
Candidate signature

In addition to this paper you should have:

- A pen, pencil and eraser.
- A ruler.
- A protractor.
- A pair of compasses.

Calculators may **not** be used.



#### Instructions to candidates

- Write your name and other details in the spaces provided above.
- Answer all questions in the spaces provided.
- In calculations show clearly how you worked out your answers.

#### Information for candidates

- There are 80 marks available for this paper.
- The marks available are given in brackets at the end of each question.
- You may get marks for method, even if your answer is incorrect.

#### Advice to candidates

- Work steadily through the paper.
- Don't spend too long on one question.
- If you have time at the end, go back and check your answers.

For examiner's use			
Q	Mark	Q	Mark
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	
<b>Total</b>			

Answer ALL the questions.

Write your answers in the spaces provided.

You must show all of your working.

1 Circle the answer to  $85.6 \div 0.4$

21.4

214

2140

2.14

[Total 1 mark]

2 Work out  $3 \times 1\frac{3}{5}$ . Circle your answer.

$\frac{26}{5}$

$\frac{21}{5}$

$3\frac{9}{15}$

$4\frac{4}{5}$

[Total 1 mark]

3 A tin of beans is completely filled with beans and sauce.  
The ratio of the volume of beans to the volume of the tin is 4 : 5.

What is the ratio of the volume of beans to the volume of sauce? Circle your answer.

$1 : \frac{1}{4}$

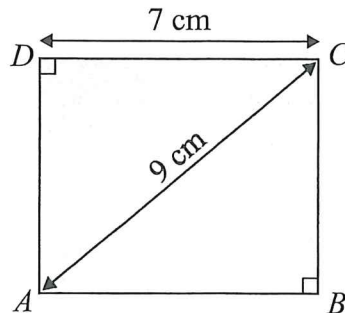
$1 : \frac{4}{5}$

1 : 5

1 : 4

[Total 1 mark]

4 Rectangle  $ABCD$  is shown below.  $DC = 7$  cm and  $AC = 9$  cm.



Not drawn  
accurately

Circle the length of line  $AD$  to 2 decimal places.

10.95 cm

11.67 cm

9.02 cm

5.66 cm

[Total 1 mark]

5 (a) Find 96 as a percentage of 75.

Leave  
blank

..... %  
[2]

(b) Increase 60 by 12%.

.....  
[2]

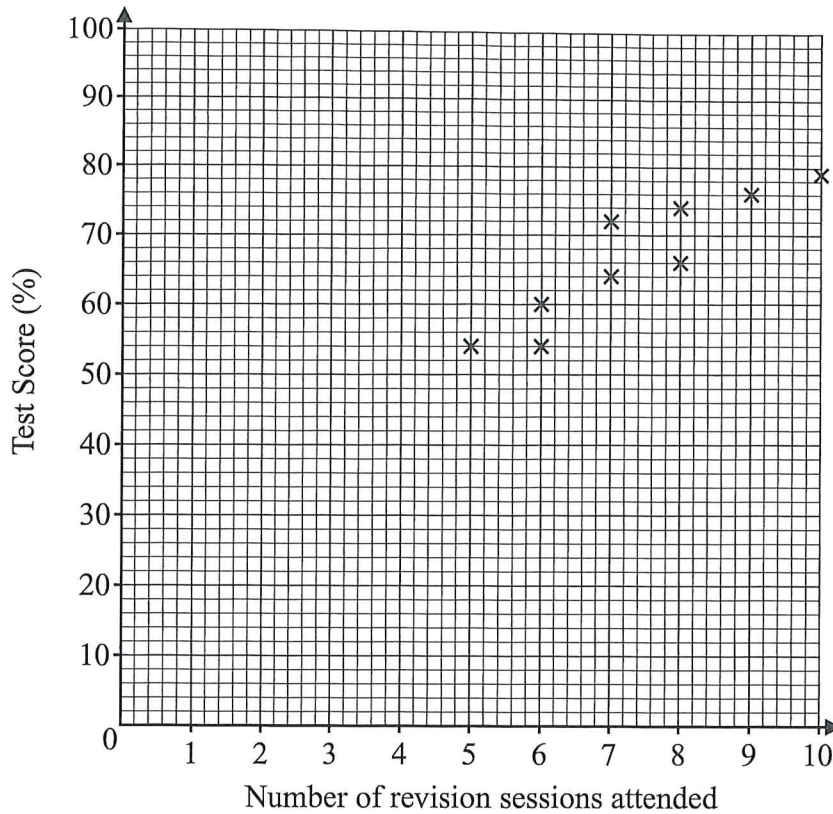
**[Total 4 marks]**

6 A squad of 14 players is selected for a mixed football tournament.  
The rules state that the ratio of boys to girls per squad must be no greater than 3 : 2  
What is the maximum number of boys that can be selected for the squad?

.....  
**[Total 2 marks]**

- 7 A teacher recorded the number of revision sessions attended by some students and the mark they scored in a test. The results are shown in this scatter diagram.

Leave blank



- (a) Draw a line of best fit.

[1]

- (b) Describe the relationship between the number of revision sessions attended and the test score achieved by the students.

.....  
 .....

[1]

- (c) Katherine was absent for the test. The teacher says, “Katherine attended two revision sessions, so she would have scored about 30% in the test.”

Comment on the reliability of the teacher’s statement.

.....  
 .....

[2]

[Total 4 marks]

8 Written as a product of powers of its prime factors,  $126 = 2 \times 3^2 \times 7$ .

Leave  
blank

(a) Write 392 as a product of powers of its prime factors.

.....  
[3]

(b) Find the highest common factor of 392 and 126.

.....  
[1]

$k$  is the smallest integer that can be multiplied by 126 to give a square number.

(c) Find the value of  $k$ .

$k =$  .....  
[1]

[Total 5 marks]

- 9 A fair 6-sided dice and a fair 10-sided dice are rolled repeatedly over the course of a game.  
The 6-sided dice (numbered 1-6) is rolled 300 times.  
The 10-sided dice (numbered 1-10) is rolled 200 times.  
Calculate an estimate for the number of times a prime number is rolled.

.....  
*[Total 3 marks]*

- 10 Mesut is investigating the average age of people who use his local sports centre.  
On a Monday morning, he asked people at the sports centre their ages.  
His results are shown in the table:

<b>Age</b>	12 – 18	19 – 30	31 – 50	Over 50
<b>Frequency</b>	10	24	12	14

Mesut says, “5 in 6 users of the sports centre are over 18. This shows that the sports centre should do more to encourage children and teenagers to use the sports centre.”

Give reasons why Mesut’s conclusion might not be correct.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
*[Total 2 marks]*

- 11 Use the approximation  $5 \text{ miles} \approx 8 \text{ km}$  to show that a car moving at a speed of 45 mph is travelling approximately 20 m/s.

**[Total 3 marks]**

- 12 Scott is a bricklayer. In his latest building project, it took 5400 bricks to build a bungalow. He was able to lay roughly 3000 bricks every 5 days.

- (a) How many days would it take for a team of 3 bricklayers to lay the bricks required for 20 bungalows?

..... days  
**[3]**

- (b) State two assumptions that you have made in part (a).

1) .....

.....

2) .....

.....

**[2]**

**[Total 5 marks]**

13 Make  $x$  the subject of  $2y = \frac{3x}{2 - 5x}$

Leave  
blank

.....  
**[Total 3 marks]**

14 Jen records the number of miles she travels by tram each day.  
After 6 days, her mean distance is 5.5 miles.

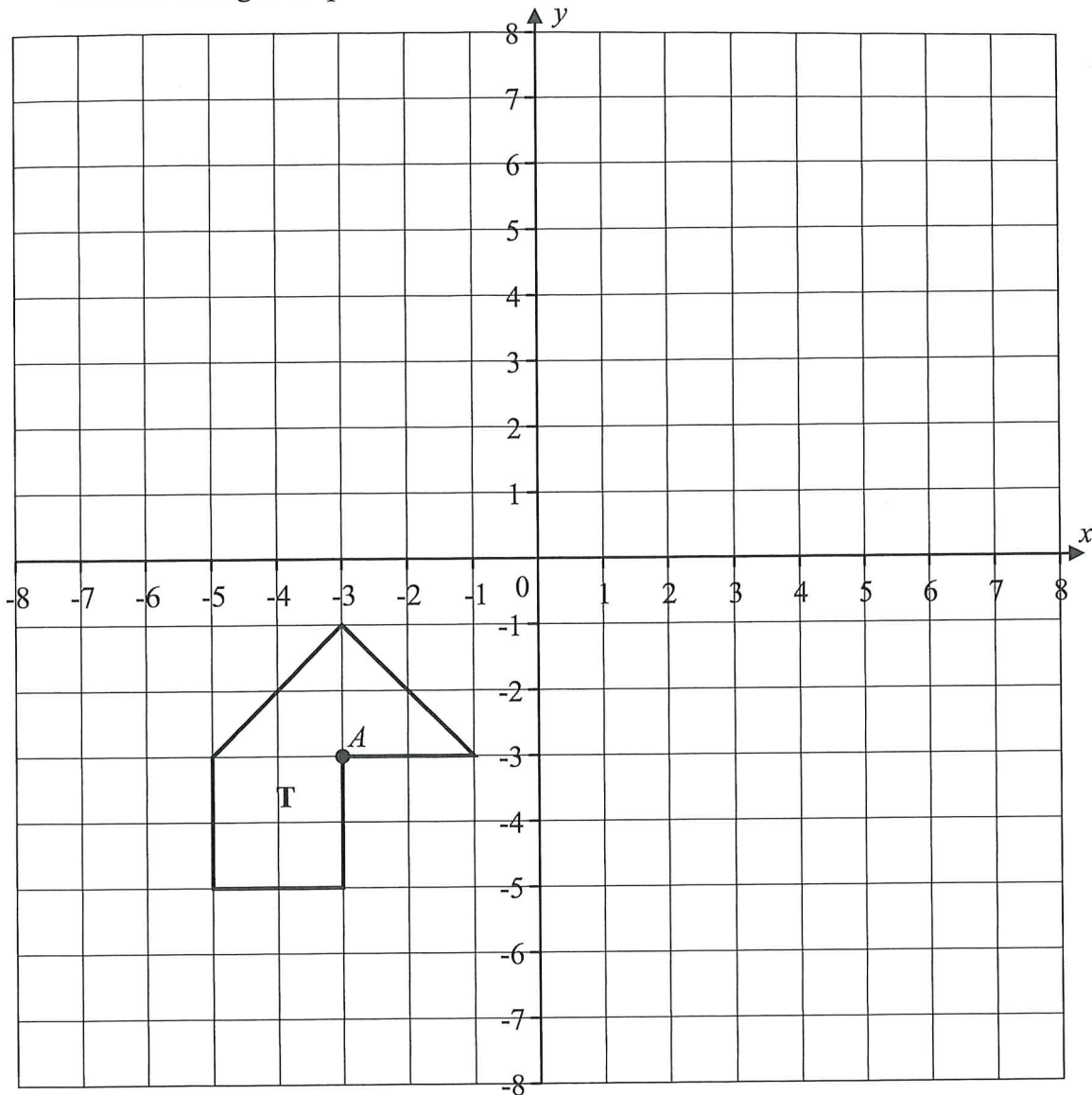
After 7 days, her mean distance had increased to 6 miles.  
How many miles did Jen travel by tram on the 7<sup>th</sup> day?

..... miles  
**[Total 3 marks]**



- 15 (a) Enlarge shape T by a scale factor  $-1$ , with centre of enlargement  $(-1, 1)$ .  
Label the enlarged shape S.

Leave  
blank



[2]

- (b) Describe another transformation that maps Shape T onto Shape S.

.....  
.....

[2]

- (c) Shape T is enlarged by scale factor 2 such that point A now lies at  $(1, -5)$ .  
What are the coordinates of the centre of enlargement? Circle your answer.

$(-5, 2)$

$(-3, -3)$

$(-7, -1)$

$(-1, -4)$

[1]

[Total 5 marks]

- 16 Calculate  $(3.2 \times 10^4) \div (8 \times 10^{-2})$   
Give your answer in standard form.

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blank

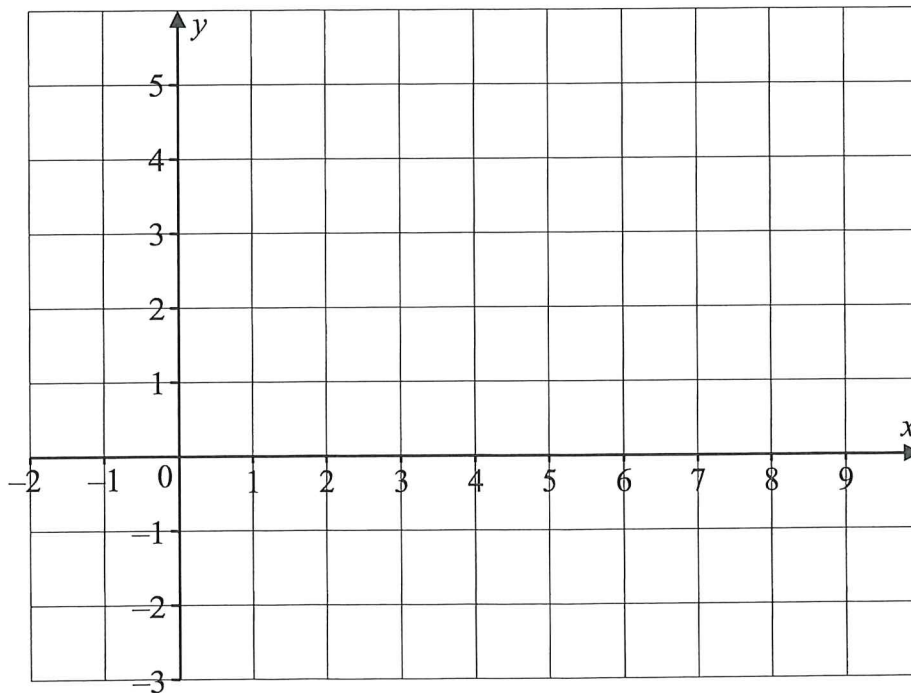
.....  
[Total 2 marks]

- 17 On the grid below, shade the region that satisfies the following inequalities:

$$2y + x \leq 8$$

$$x \geq 1$$

$$y \geq x - 1$$



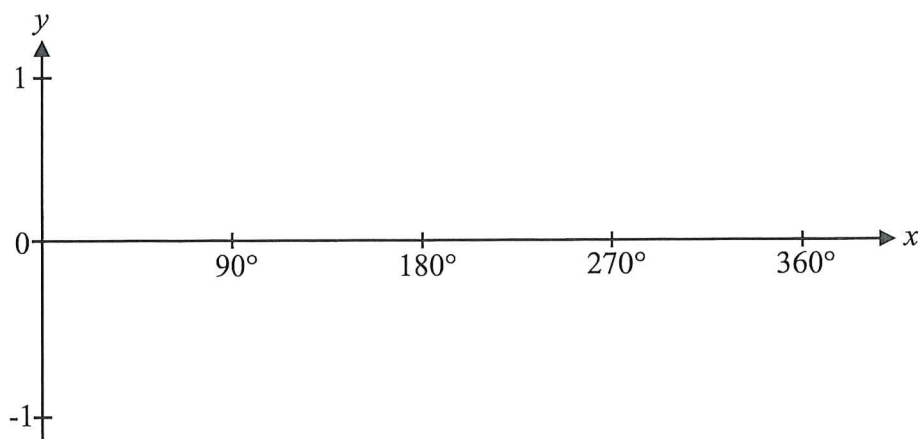
[Total 4 marks]

18  $a$  is an acute angle such that  $\sin a = \frac{3}{2\sqrt{6}}$

(a) By sketching a right angled triangle, show that  $\tan a = \frac{3}{\sqrt{15}}$

[3]

(b) On the axes below, sketch the graph of  $y = \sin x$  for  $0^\circ \leq x \leq 360^\circ$ .



[2]

(c)  $\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$

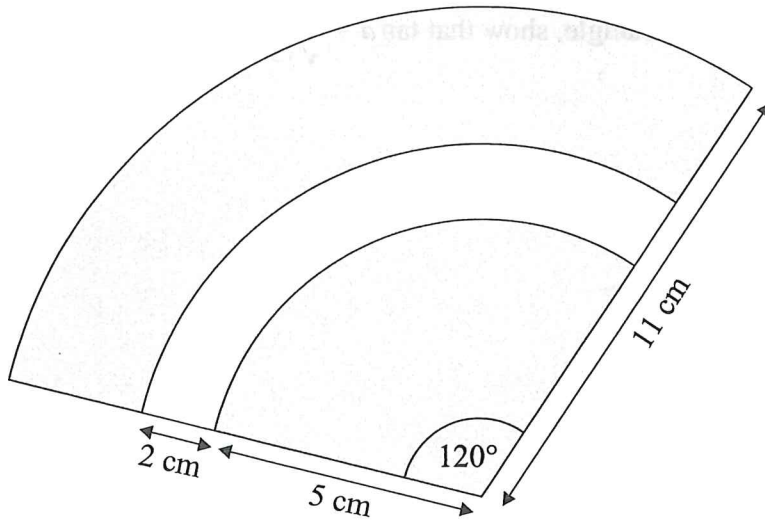
Solve the equation  $\sin x = -\frac{1}{2}$  for  $0^\circ \leq x \leq 360^\circ$ .

.....  
[2]

[Total 7 marks]

19 The shape below is a sector of a circle.

Leave  
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Not drawn  
accurately

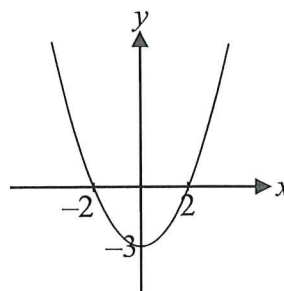
Calculate the shaded area of the shape. Give your answer in terms of  $\pi$ .

.....  $\text{cm}^2$

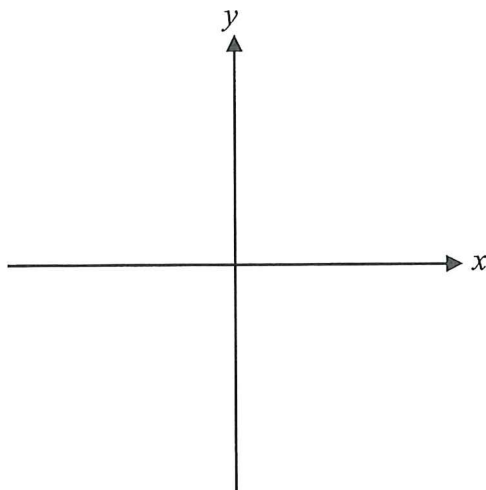
**[Total 4 marks]**

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- 20 The diagram shows a sketch of the graph  $y = f(x)$ . The graph passes through the points  $(-2, 0)$ ,  $(2, 0)$  and  $(0, -3)$ . Sketch the graphs for the following functions, showing clearly the points where the graphs cross the  $x$ -axis and  $y$ -axis.

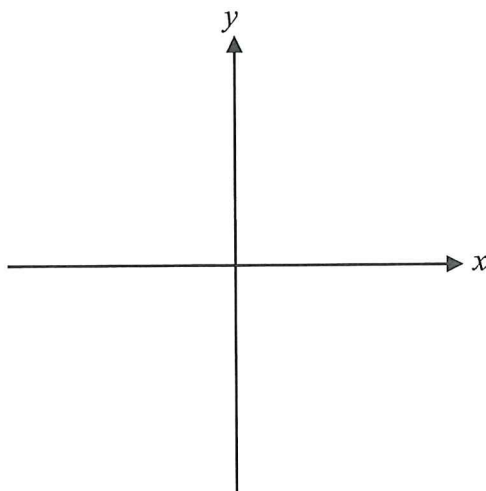


(a)  $y = f(x + 2)$



[2]

(b)  $y = -f(x)$



[2]

[Total 4 marks]

21 Show that  $2 \sin 60^\circ \times \tan 30^\circ = 1$

Leave  
blank

**[Total 3 marks]**

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22 (a) Write the expression  $x^2 - 6x - 2$  in the form  $(x + a)^2 + b$

.....  
[2]

(b) Circle the coordinates of the turning point of the graph  $y = x^2 - 6x - 2$

(-8, -2)

(11, 3)

(3, -11)

(6, -2)

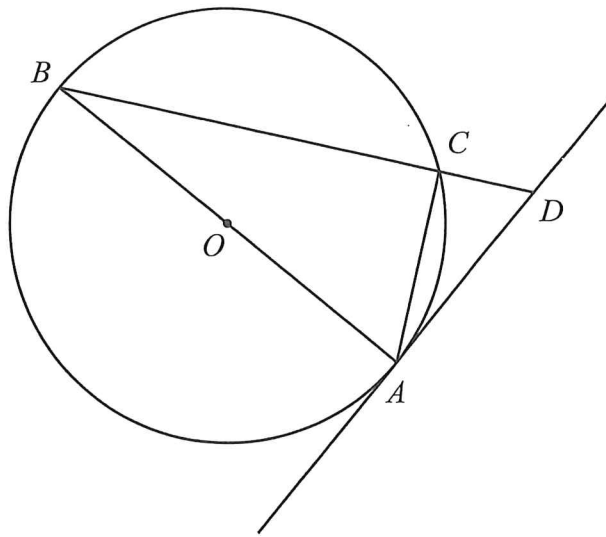
[1]

**[Total 3 marks]**

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- 23 A circle, with centre  $O$ , has a tangent at  $A$  that passes through point  $D$ .  $BCD$  is a straight line.

Leave  
blank



Show that  $ABC$ ,  $ABD$  and  $ACD$  are all similar triangles.

**[Total 4 marks]**

- 24 At a party, there are  $c$  children and  $a$  adults.  
The ratio of the number of children to the number of adults at the party is  $c : a$ .  
3 more children and 3 more adults arrive and the ratio is now  $2 : 3$ .  
Then 2 children leave and 2 more adults arrive, and the ratio becomes  $1 : 2$ .  
Find the ratio  $c : a$  in its lowest terms.

*Leave  
blank*

.....  
***[Total 6 marks]***

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***[TOTAL FOR PAPER = 80 MARKS]***