

**OCR**

Oxford Cambridge and RSA

**F**

Wednesday 2 November 2016 – Morning

**GCSE MATHEMATICS A****A502/01** Unit B (Foundation Tier)

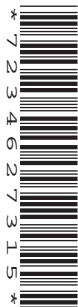
Candidates answer on the Question Paper.

**OCR supplied materials:**

None

**Other materials required:**

- Geometrical instruments
- Tracing paper (optional)

**Duration:** 1 hour

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Your quality of written communication is assessed in questions marked with an asterisk (\*).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

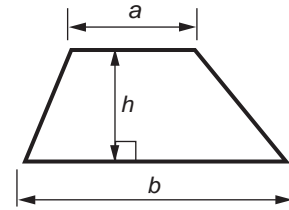
**WARNING**

No calculator can be  
used for this paper

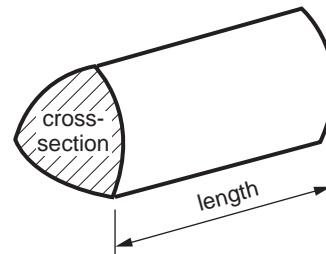
2

## Formulae Sheet: Foundation Tier

**Area of trapezium** =  $\frac{1}{2} (a + b)h$



**Volume of prism** = (area of cross-section) × length



**PLEASE DO NOT WRITE ON THIS PAGE**

3

Answer **all** the questions.

1 (a) Work out.

$$3.16 + 2$$

(a) \_\_\_\_\_ [1]

(b) Work out.

$$9.31 - 4.6$$

(b) \_\_\_\_\_ [1]

(c) Work out.

$$2.5 \times 4$$

(c) \_\_\_\_\_ [1]

(d) Work out.

$$5^3$$

(d) \_\_\_\_\_ [1]

(e) Put a tick (✓) beside the **one** calculation that gives the same answer as  $12.5 \div 0.2$ .

Calculation	
$12.5 \div 2$	
$1250 \div 2$	
$125 \div 20$	
$1.25 \div 2$	
$125 \div 2$	

[1]

Turn over

2 Sam has these 10 cards.



She follows these steps.

STEP 1	Pick two of the 10 cards and make a two-digit number.	<b>Example</b> 1 and 4 make 14
STEP 2	Subtract this two-digit number from 100.	$100 - 14 = 86$
STEP 3	Choose two of the remaining cards that make this answer.	Choose 8 and 6
STEP 4	Write down your two-digit numbers as a sum.	$14 + 86 = 100$

- (a) In STEP 1, Sam picks 2 and 4.  
Sam can make two **different** sums when she follows STEPs 2, 3 and 4.

Complete both sums below.

$$24 + \underline{\hspace{2cm}} = 100$$

$$42 + \underline{\hspace{2cm}} = 100$$

[2]

- (b) When Sam picks certain cards in STEP 1, she cannot complete STEP 3.

She makes this rule, 'In STEP 1, I must **not** pick cards that add up to 9.'

- (i) Sam uses cards 2 and 7 to test her rule.

Work out  $100 - 27$ .

Use your answer to explain why Sam cannot complete STEP 3.

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[2]

5

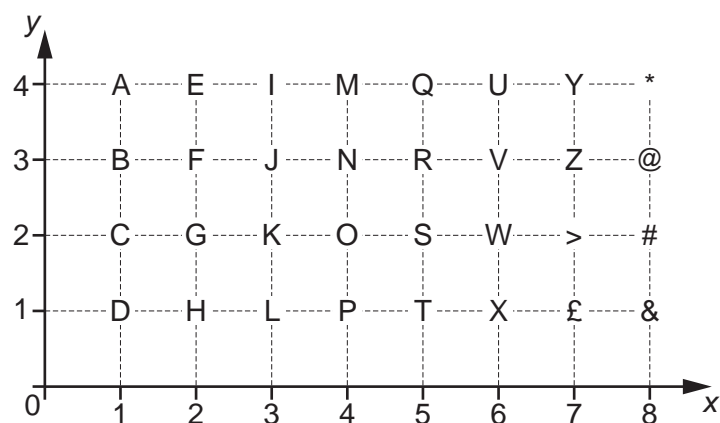
- (ii)\* Find
- a rule about how to use 5 if it is chosen in STEP 1
  - and
  - a rule about 0 if it is chosen in STEP 1.

Explain how your rules work, using two examples for each rule.

**[5]**

6

- 3 The letters of the alphabet and some characters are shown on a coordinate grid.



- (a) Write down the coordinates of the letter K.

(a) ( \_\_\_\_\_ , \_\_\_\_\_ ) [1]

- (b) Write down the letter or character at the point with coordinates (4, 1).

(b) \_\_\_\_\_ [1]

- (c) B, F, J, N, R, V, Z and @ all lie on a line.

Put a tick (✓) beside the equation of this line.

$x = 3$	
$x + y = 3$	
3	
$y = 3$	
(1, 3) to (8, 3)	

[1]

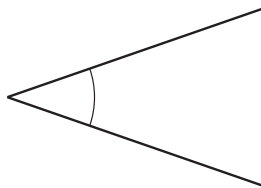
- (d) The letters D, G, J and M are on the line  $y = x$ .

Write down the gradient of this line.

(d) \_\_\_\_\_ [1]

7

- 4 (a) Write down the mathematical name for this type of angle.



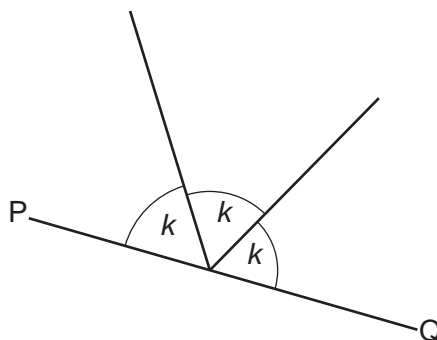
(a) \_\_\_\_\_ [1]

- (b) There are 90 degrees in 1 right-angle.

Change  $1\frac{1}{3}$  right-angles to degrees.

(b) \_\_\_\_\_ degrees [1]

- (c) PQ is a straight line.  
Work out the size of angle  $k$ .

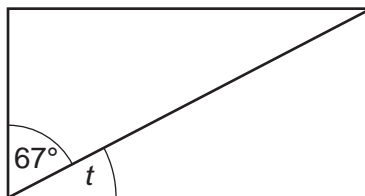


Not to scale

(c) \_\_\_\_\_ ° [2]

- (d) Here is a rectangle.

Work out the size of angle  $t$ .



Not to scale

(d) \_\_\_\_\_ ° [2]

8

5 Lenny employs only three people, Karen, Manjit and Ana.

Each week, Karen works for 30 hours and Manjit and Ana each work for 35 hours.  
Lenny increases their pay from £8.10 per hour to £9.90 per hour.

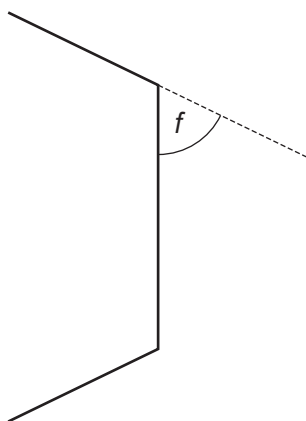
How much **more** in total does Lenny now pay for wages each week?

£ \_\_\_\_\_ [4]



9

- 6 (a) A regular **octagon** has one side extended.

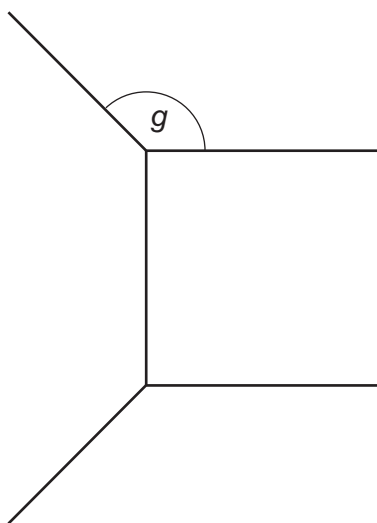


Not to scale

Work out the size of angle  $f$ .

(a) \_\_\_\_\_ ° [2]

- (b) A square is drawn to fit on one side of a regular **10-sided polygon**.



Not to scale

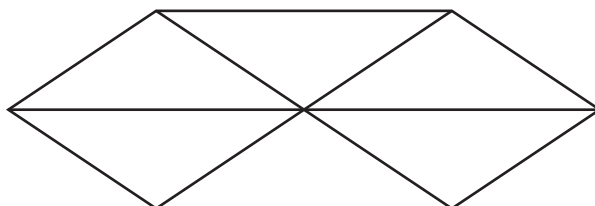
Work out the size of angle  $g$ .

(b) \_\_\_\_\_ ° [4]

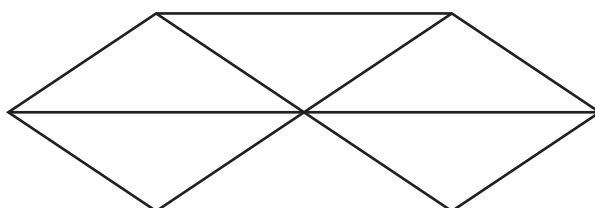
10

7 A hexagonal logo is made by joining six congruent isosceles triangles.

Each diagonal is parallel to two sides of the hexagon.

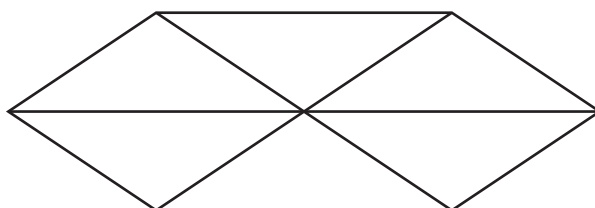


(a) (i) Shade **one triangle** so that the logo has only 1 line of symmetry.



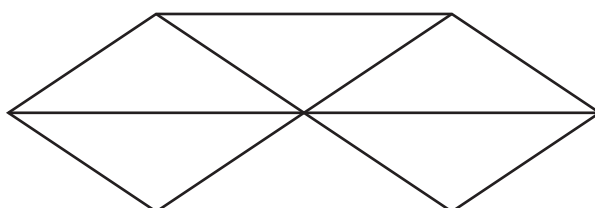
[1]

(ii) Shade **two triangles** so that the logo has rotation symmetry order 2.



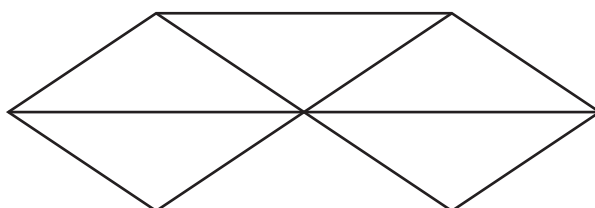
[1]

(iii) Shade a trapezium.



[1]

(iv) Mark two corresponding angles.



[1]

11

- (b) Another polygon is regular.  
 The total distance around this polygon is  $10a$ .  
 Each side has length  $na$ , where  $n$  is a whole number.

Complete the table for each possible polygon.

Number of sides	Name of polygon	Length of each side, in terms of $a$
	Decagon	

[4]

- 8 Solve this inequality.

$$2x + 5 > 19$$

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 [2]

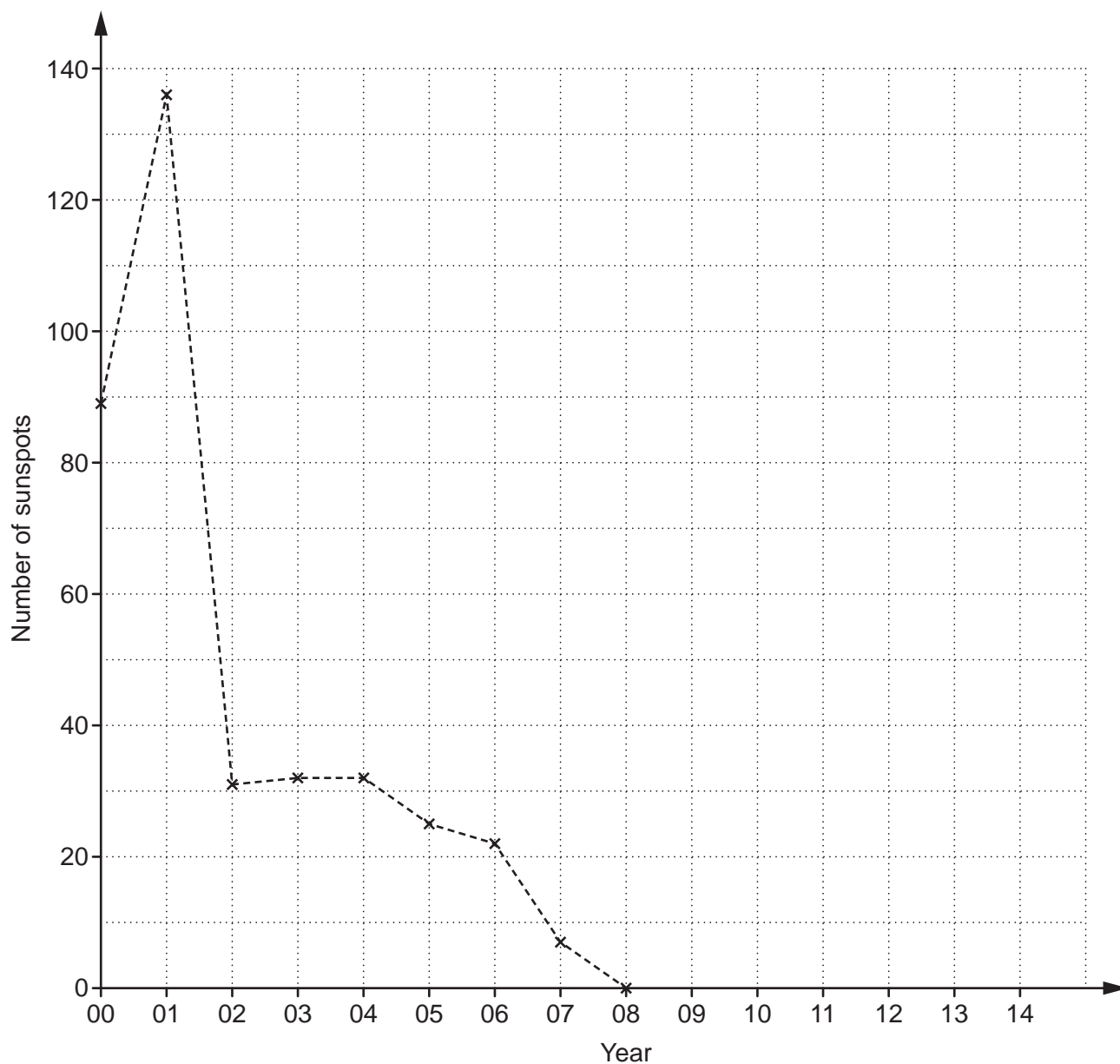
## 12

- 9 (a) This table gives the number of sunspots observed on 1<sup>st</sup> January each year from 2000 (recorded as 00) to 2014 (recorded as 14).

Year	00	01	02	03	04	05	06	07	08
Number of sunspots	89	136	31	32	32	25	22	7	0

Year	09	10	11	12	13	14
Number of sunspots	12	33	44	65	87	74

- (i) Plot the last 6 values and complete the time series graph.



[2]

13

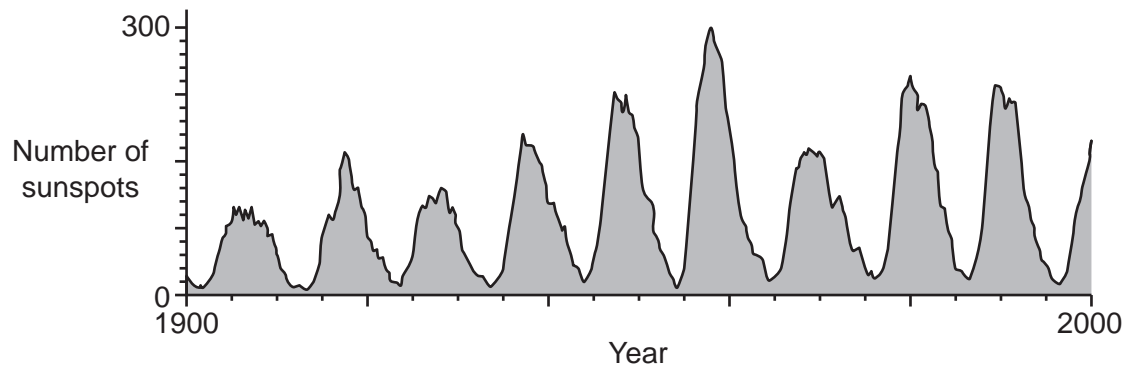
(ii) Describe the trend in the number of sunspots between 2000 and 2014.

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[1]

(b) This time series graph shows the number of sunspots each year during the last century.



Explain how the graph shows that peaks in sunspot activity occur roughly every 11 years.

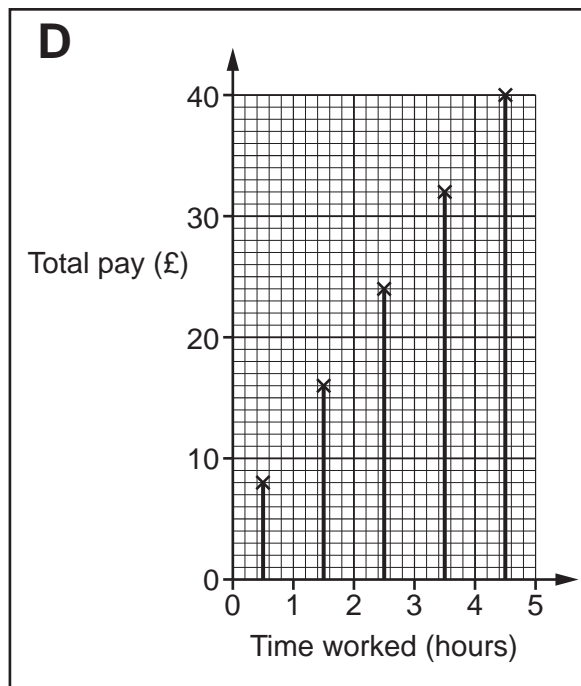
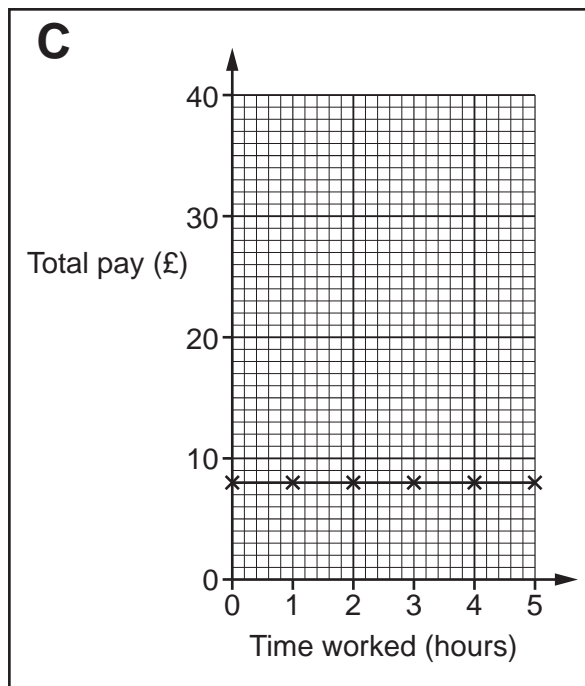
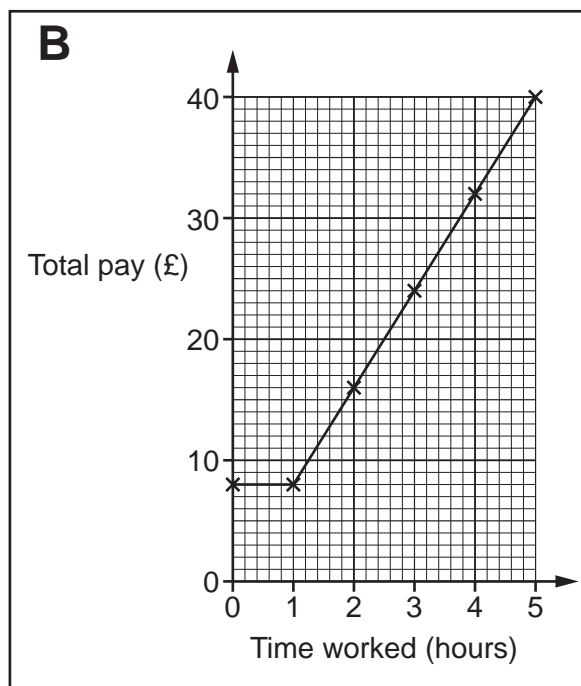
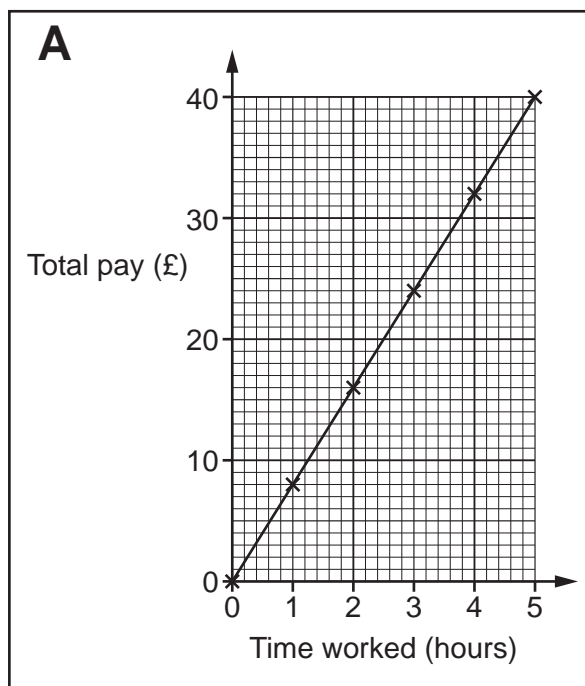
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[3]

10 (a) Asif is paid at a rate of £8 per hour.

Select the line graph that shows this information by putting a ring around A or B or C or D.



[1]

(b) Give a reason why each of the other graphs is incorrect.

Graph \_\_\_\_\_ because \_\_\_\_\_

Graph \_\_\_\_\_ because \_\_\_\_\_

Graph \_\_\_\_\_ because \_\_\_\_\_

[3]

15

- 11 (a) Helen's DIY store sells brass screws of different sizes. She picks out 4 screws. Their lengths, in inches, are as follows.

$$\frac{5}{8} \quad 1\frac{1}{4} \quad \frac{1}{2} \quad \frac{3}{4}$$

Put these lengths in order of size, starting with the smallest.

(a) \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ [3]  
*smallest*

- (b) Many years ago people did not know an exact value for  $\pi$  so approximations were used.

People (Date)	Their approximation to $\pi$
Egyptian (1800 BC)	3.1250
Indian (600 BC)	3.088
Chinese (100 AD)	3.14
Jewish (150 AD)	3.142857
Modern (2016 AD)	3.141593

- (i) Write down any of these values that are larger than the Modern value.

(b)(i) \_\_\_\_\_ [1]

- (ii) Work out the difference between the value used in 100 AD and the Modern value. Give your answer correct to 2 significant figures.

(ii) \_\_\_\_\_ [2]

END OF QUESTION PAPER

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