

Name

Examination Number

Room Number

WITHINGTON GIRLS' SCHOOL

ENTRANCE EXAMINATION 2016

MATHEMATICS

PAPER 2

TIME: 40 MINUTES

- Some questions in this paper involve new ideas, but there are examples to guide you and help you understand these new ideas.
- Look at the examples carefully and try to answer all the questions.
- If you cannot answer a question, leave it and go on to the next one.
- Use any time you have left to check your answers and go back to any questions you have left out.

CALCULATORS MUST NOT BE USED

PAPER 2 TOTAL		
Marker's Initials		
Checker's Initials		

1 Can you crack the code and translate the message?

1

B	C	D
A	I	E
H	G	F

2

K	L	M
J	R	N
Q	P	O

3

T	U	V
S		W
Z	Y	X

1	2	2	1		2	3	1	2
_____	_____	_____	_____		_____	_____	_____	_____

1
1

2. A ball of string contains $7\frac{1}{2}$ metres. It is cut into 20 cm lengths.

(a) How many pieces can be made?

1
1

(b) How much string is left?

_____ cm

1

3. Here are two sequences of numbers

- | | | | | | | |
|---|---|----|----|----|----|-------|
| 1 | 4 | 7 | 10 | 13 | 16 | |
| 2 | 6 | 10 | 14 | 18 | 22 | |

The number 10 is in both sequences.
What are the next two numbers that are in both sequences?

1
1

4. Place the numbers

- 1 2 3 4 6 9 18

in the grid so that the product (multiplication) of the numbers in each vertical and horizontal line equal to 36.

Below are some grids to try out your ideas.

Put your final answer on the big grid on the right.

Answer grid

1
1
1

5. Alice buys 6 packets of pasta. Each packet of pasta costs 95 pence. She also buys 5 packets of rice. In total she spends £11.70. How much does a packet of rice cost?

£ _____

1
1

6. Jamie-Anne and Natasha both collect stamps. The ratio of the number of stamps is 5:3. If Jamie-Anne has 18 more stamps than Natasha, how many stamps do they have in total?

_____ stamps

1
1

7. (a) Ellie has 240 sweets. Each week she buys 45 new sweets and eats 60 old ones. After how many weeks will she have 150 sweets left?

_____ weeks

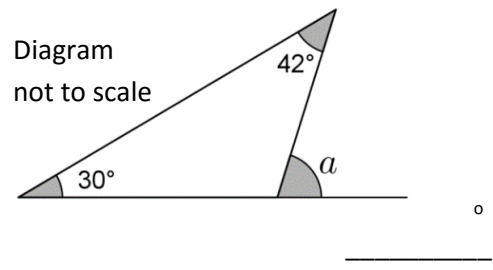
1
1

(b) Sophie has 320 sweets. Each week she buys 30 new sweets and eats some old ones. After 7 weeks she has 348 sweets. How many sweets does she eat each week?

_____ sweets

1
1

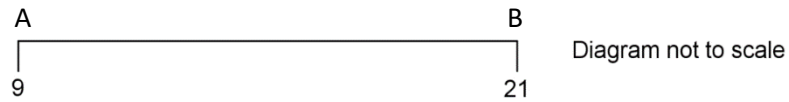
8. What is the size of angle a ?



1
1

PLEASE TURN OVER

9. Look at the number line AB.



C and D are points on the line AB.

(a) $AC = \frac{1}{3}AB$. What number is C?

1

1

(b) $AD = 3DB$. What number is D?

1

1

10. There are 20 questions in a quiz. Points are awarded in the following way

- 4 points for a correct answer
- 0 points for questions unanswered
- -3 points for questions answered incorrectly

(a) Leah answers 10 questions correctly, 3 incorrectly and left 7 blank. What was her total score?

1

1

(b) Tammy's total score was 37 and answered 13 questions correctly. How many questions did she answer incorrectly?

1

1

(c) Nicole got a score of 15 and answered 7 questions incorrectly. How many questions did she answer correctly?

1

1

11. A quick way to subtract two square numbers is to use the rule

$$a^2 - b^2 = (a + b)(a - b)$$

For example

$$26^2 - 16^2 = (26 + 16)(26 - 16) = 42 \times 10 = 420$$

Use this rule to work out $31^2 - 29^2$. (No marks will be award if you do not use the rule.)

1

1

12. In the Debenham's sale everything is reduced by 25%.

(a) What is the sale price of a Segway which originally cost £300?



1

1

£ _____

(b) The sale price of a jumper was £24.
How much did it cost originally?



1

1

£ _____

13. These are powers of x

$$x^2 = x \times x$$

$$x^3 = x \times x \times x$$

$$x^4 = x \times x \times x \times x$$

For example

$$2^3 = 2 \times 2 \times 2 = 8$$

(a) What is $2^2 \times 3^3$?

(b) $x^4 = 81$, what is x ?

1

1

(c) What numbers are \blacksquare and \blacklozenge if

$$2^{\blacksquare} \times 3^{\blacklozenge} = 72$$

1

$\blacksquare =$ _____

1

$\blacklozenge =$ _____

PLEASE TURN OVER

14. Fill in the missing gaps

(a) 25% of $32 = \square$ % of 40

1

1

(b) 40% of $35 = 50\%$ of \square

1

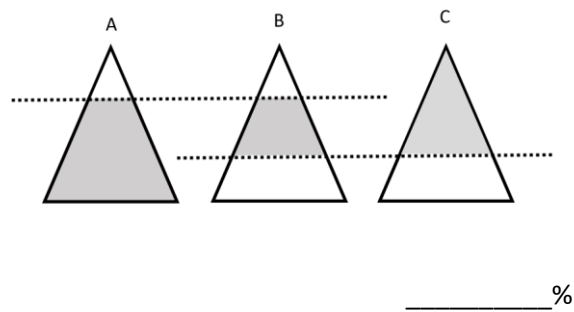
1

(c) $\frac{3}{8}$ of $16 = \frac{2}{9}$ of \square

1

1

15. The diagram shows 3 identical triangles A, B and C.
 80% of triangle A is shaded.
 60% of triangle C is shaded.
 What percentage of triangle B is shaded?



1

1

16. In 7W there are 28 girls.
 20 like One Direction.
 17 like The Vamps.
 15 like both One Direction and The Vamps.
 How many girls like neither One Direction nor The Vamps?

1

1

17. Ana is 116 cm taller than Olaf.
 Kristoff is five and a half times the height of Olaf.
 Ana is 150 cm. How much taller is Kristoff than Ana?

1

1

1

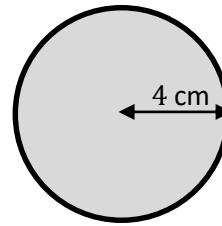
_____ cm

18. An estimate for the area of a circle, radius r , is

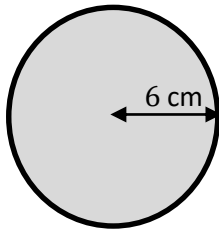
$$\text{Area} = 3 \times r^2 = 3 \times r \times r$$

For example

$$\begin{aligned} \text{Area} &= 3 \times 4^2 \\ &= 3 \times 4 \times 4 \\ &= 3 \times 16 \\ &= 48 \text{ cm}^2 \end{aligned}$$



(a) Find an estimate for the area of the circle.

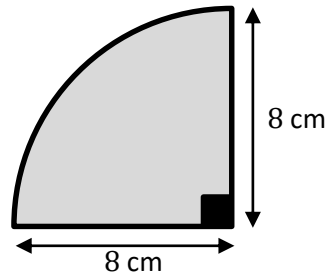


1

1

_____ cm²

(b) Find an estimate for the area of this shape.



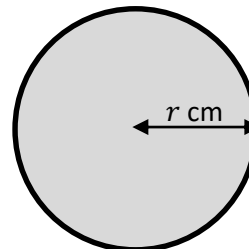
1

1

1

_____ cm²

(c) An estimate for the area of the circle is 147 cm².
Find the radius of the circle.

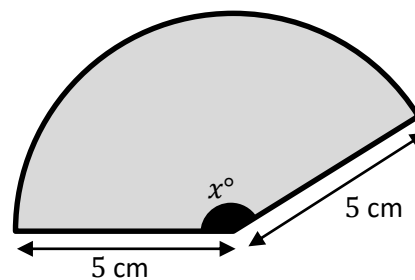


1

1

_____ cm²

(d) The area of this shape is 25 cm².
Find the size of the angle marked x .



1

1

1

_____ °

PLEASE TURN OVER

19. A decimal which goes on forever (infinite) and has a pattern which repeats is called recurring. Dots are often used to show the digits which recur.

For example

$$0.444444 \dots = 0.\dot{4}$$

$$0.545454 \dots = 0.\dot{5}\dot{4}$$

The following method can be used to change recurring decimals into fractions.

(a) **Use this method** to change $0.777 \dots = 0.\dot{7}$ into a fraction.

$$\begin{array}{r} x = 0.444444 \dots \\ 10x = 4.444444 \dots \\ \hline \end{array}$$

Subtracting $9x = 4$

$$x = \frac{4}{9}$$

1
1

In order to change decimals with two recurring digits into a fraction you use the following method.

(b) **Use this method** to change $0.2424 \dots = 0.\dot{2}\dot{4}$ into a fraction in its lowest form.

$$\begin{array}{r} x = 0.545454 \dots \\ 100x = 54.545454 \dots \\ \hline \end{array}$$

Subtracting $99x = 54$

$$x = \frac{54}{99}$$

$$x = \frac{6}{11}$$

1
1

(c) Now use a similar method to change $0.152152 \dots = 0.\dot{1}\dot{5}\dot{2}$ into a fraction.

1
1
1

END OF TEST – NOW CHECK YOUR ANSWERS