Surname	Centre Number	Candidate Number
Other Names		0

GCSE – NEW

3300U30-1

S17-3300U30-1

MATHEMATICS
UNIT 1: NON-CALCULATOR
INTERMEDIATE TIER

SOLUTIONS

TUESDAY, 13 JUNE 2017 – MORNING

1 hour 45 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **9**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	6	
2.	3	
3.	4	
4.	3	
5.	2	
6.	4	
7.	6	
8.	5	
9.	7	
10.	6	
11.	5	
12.	4	
13.	3	
14.	3	
15.	3	
16.	5	
17.	4	
18.	2	
19.	5	
Total	80	

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Examine only

1. (a) Write down the next two numbers in the following sequence. [2]

35, 25, 16, 8, 1, -5

-10 -9 -8 -7 -6

(b) Find the value of $2x + 7y$ when $x = -3$ and $y = 10$. [2]

$2(-3) + 7(10)$

$= -6 + 70$

$= 64$

(c) Simplify the expression $8k + 3m - 2k - 8m$. [2]

$= 6k - 5m$

2. Write down 0·4, 15% and $\frac{7}{20}$ in ascending order.

You must show all your working. [3]

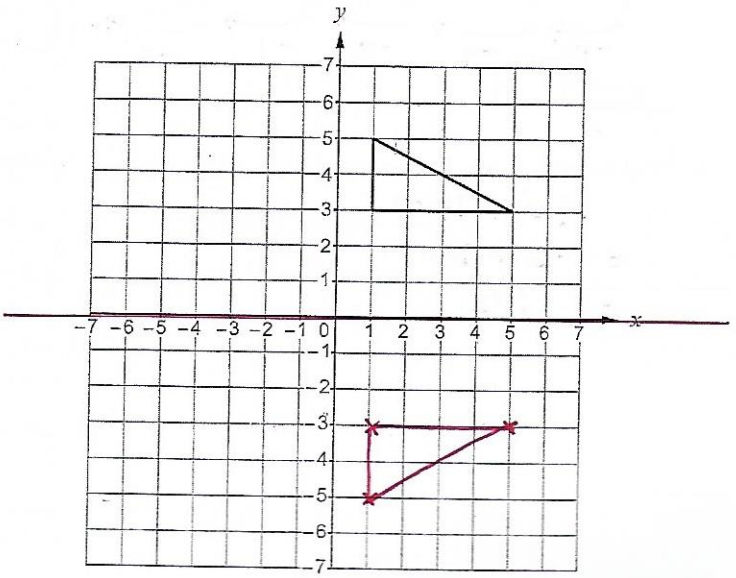
$0{\cdot}4 = 40\%$ $\frac{7}{20} = \frac{35}{100} = 35\%$

15% 7/20 0·4

Smallest value ⟶ Greatest value

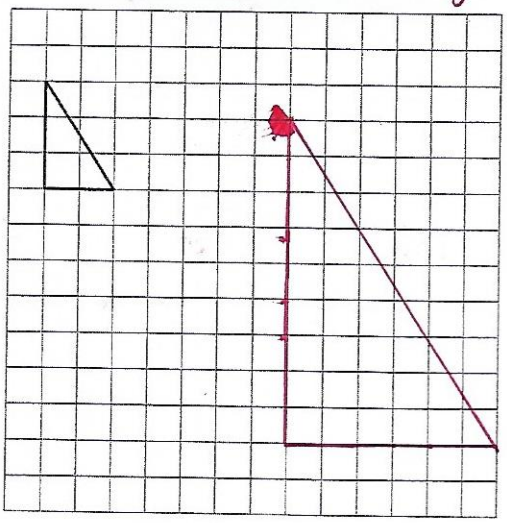
Exam only

3. *(a)* Reflect the triangle below in the x-axis. [1]



(b) Enlarge the triangle below by a scale factor of 3. [2]

You can draw the large triangle anywhere!

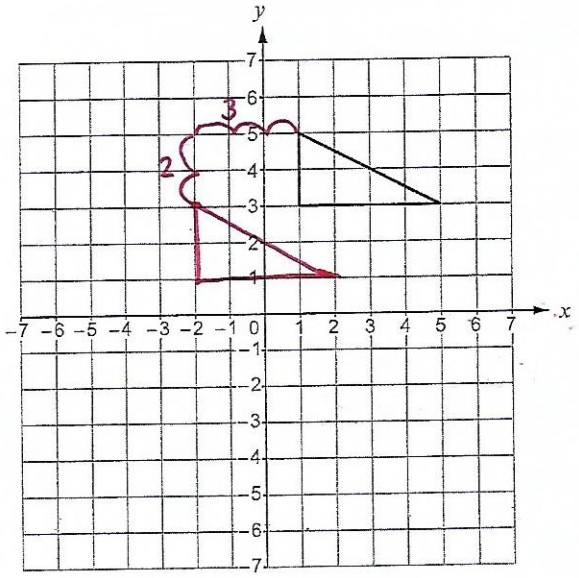


All sides are ×3

Examiner only

(c) Translate the triangle below 3 squares to the left and 2 squares down. [1]

MOVE



4. *(a)* A fair, six-sided dice is rolled.
What is the probability that a 4 is shown on the dice?
Circle your answer. [1]

6% $\frac{1}{5}$ $\frac{1}{4}$ 6:1 $\frac{1}{6}$

(b) 50 raffle tickets were sold at a charity event.
Sian has a 20% chance of winning the top prize.
How many tickets did Sian buy?
Circle your answer. [1]

1 2 4 10 20

20% of 50
First 10% = 5
So 20% = 10

(c) A bag contains a mixture of blue beads, yellow beads and pink beads.
One bead is taken at random from the bag.

The probability that the bead is pink is $\frac{1}{5}$.

Which of the following sets of beads could have been in the bag?
Circle your answer. [1]

P(pink) $= \frac{3}{15} = \frac{1}{5}$

P(pink) $= \frac{5}{15} = \frac{1}{3}$

P(pink) $= \frac{5}{7}$

P(Pink) $= \frac{1}{11}$

P(pink) $= \frac{6}{15} = \frac{2}{5}$

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5. Team A and Team B play in a competition.

Team A has nine more points than Team B.
Team A has four times as many points as Team B.

How many points does each team have? [2]

TRY

Team A	Team B	
10	1	X
11	2	X
12	3	✓

Team A: 12 points Team B: 3 points

6. David, Jane and Mary are beach inspectors.
Three beaches, Harlech, Rhyl and Porthcawl, are all to be inspected on a certain day.
It is decided to share the work so that the inspectors will visit one beach each, chosen at random.

(a) List all the possible different ways they could share the work.
One has been done for you. [2]

David → Harlech, Jane → Rhyl and Mary → Porthcawl

David → Rhyl
David → Porthcawl
Jane → Harlech
Jane → Porthcawl
Mary → Rhyl
Mary → Harlech

(b) What is the probability that one of the female inspectors will visit Rhyl? [2]

$\frac{2}{9}$ ← 2 females go to Rhyl
out of
9 options

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7. *ABCD* is a quadrilateral.

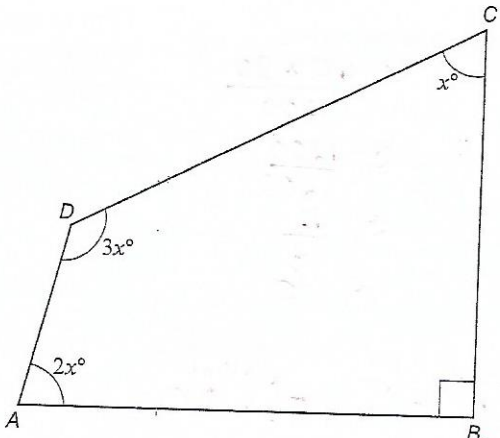


Diagram not drawn to scale

Angles in a quad add up to 360°

(a) Calculate the value of x. [4]

$3x + 2x + x + 90^\circ = 360^\circ$

$6x + 90^\circ = 360^\circ$

$6x = 360 - 90$

$6x = 270$

$x = \frac{270}{6}$

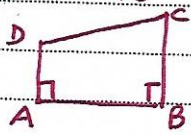
$x = 45^\circ$

45
6 | 270

(b) When *ABCD* is drawn to scale, would the lines *AD* and *BC* be parallel or not? You must justify your answer without using a scale drawing. [2]

If $x = 45^\circ$, $2x = 90^\circ$

∴ picture looks like



So AD and BC are parallel.

8. *(a)* Estimate the value of $\frac{41{\cdot}3 \times 29{\cdot}6}{198{\cdot}7}$.

You must show all your working. [2]

$\approx \frac{40 \times 30}{200}$

$\approx \frac{1200}{200}$

$\approx \frac{12}{2}$

≈ 6

(b) Given that $54 \times 84{\cdot}2 = 4546{\cdot}8$, write down the exact value of each of the following.

(i) 540×842 (×10, ×10, ×10×10) $= 454680$ [1]

(ii) $\frac{4546{\cdot}8}{5{\cdot}4} = 842$ [1]

(iii) $\frac{454{\cdot}68}{84{\cdot}2} = 5{\cdot}4$ [1]

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9. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

In the diagram below,

- *ABCD* is a rectangle, and
- *PQ* is parallel to *AD*.

NOTICE

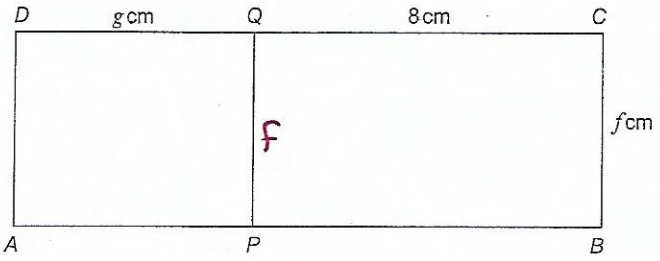


Diagram not drawn to scale

The area of *ABCD* is 52 cm^2.
The area of *APQD* is 20 cm^2.

Calculate the values of f and g.
You must show all your working.

[5 + 2 OCW]

2 Marks for method

APQD

$g \times f = 20$

Could be 20×1

10×2

5×4

Try 20×1

ABCD

Area $= 28 \times 1$

$= 28$ ✗

Try 10×2

ABCD

Area $= 18 \times 2$

$= 36$ ✗

Try 5×4

Area $= 13 \times 4$

$= 52$ ✓

∴ $g = 5$ cm

$f = 4$ cm.

10. Ceri has a set of cards.
Each of her cards is labelled North, East, South or West.

(a) Ceri chooses one card at random from her set of cards.
Complete the table below to find the probability of Ceri choosing a card labelled West. [2]

Label	North	East	South	West
Probability	0·4	0·25	0·2	0·15

$0.4 + 0.25 + 0.2 = 0.85$

$\therefore P(\text{West}) = 0.15$

(b) Ceri chooses one card at random from her set of cards.

What is the probability that the card is labelled East or South? [2]

$0.25 + 0.2$

$= 0.45$

(c) Sasha has an identical set of cards.
Ceri and Sasha each choose one card at random from their set of cards.

What is the probability that they both choose a card labelled North? [2]

$P(\text{North and North})$

$= 0.4 \times 0.4$

$= 0.16$

11. The table below shows some of the values of $y = x^2 - 5x + 2$, for values of x from -1 to 5.

x	-1	0	1	2	3	4	5
$y = x^2 - 5x + 2$	8	2	-2	-4	-4	-2	2

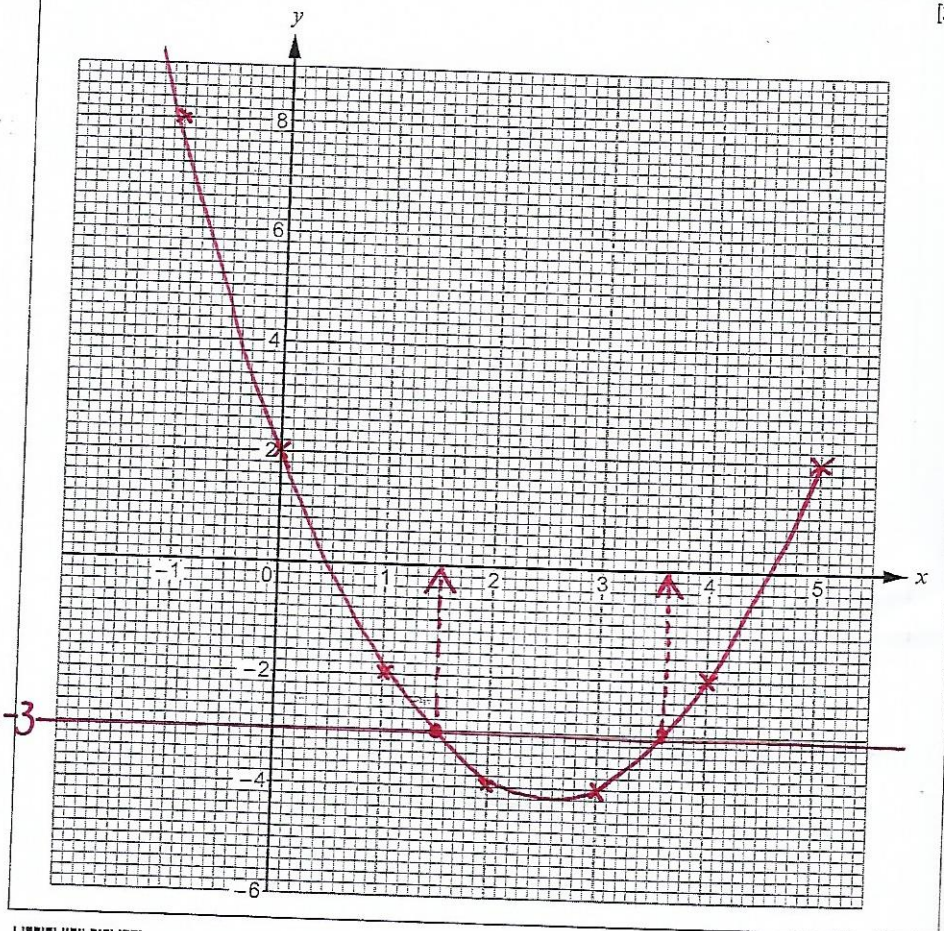
(a) Complete the table above. [1]

$x = 3 \quad y = (3)^2 - 5(3) + 2$

$y = 9 - 15 + 2$

$y = -4$

(b) On the graph paper below, draw the graph of $y = x^2 - 5x + 2$ for values of x from -1 to 5. [2]



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only

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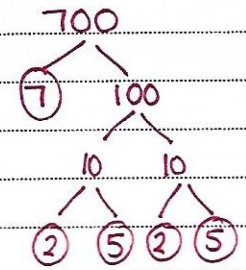
(c) Draw the line $y = -3$ on the graph paper. ← Horizontal line at -3 on the y axis

Write down the values of x where the line $y = -3$ cuts the curve $y = x^2 - 5x + 2$.
Give your answers correct to 1 decimal place. [2]

Values of x are 1·5 and 3·6

12. (a) Express 700 as a product of its prime factors in index form. [3]



$700 = 2 \times 2 \times 5 \times 5 \times 7$

$= 2^2 \times 5^2 \times 7$

(b) The number 33 554 432 is equal to 2^{25}.

Explain how this tells you that 33 554 432 is not a square number. [1]

Square numbers would have an even power.

25 is not even.

∴ It is not a square number.

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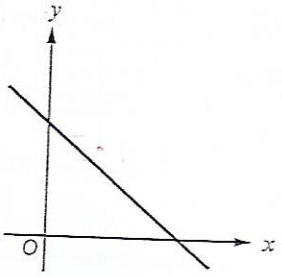
13. *(a)*



Which **one** of the following equations could represent the line shown in the graph above?
Circle your answer. [1]

$y = -x - 2$ $\quad$ $y = -x + 2$ $\quad$ $y = x + 2$ $\quad$ $y = x - 2$ $\quad$ $y = -x$.

(b) Which **one** of the following points lies on the line $2y = 3x + 4$?
Circle your answer. [1]

(2, –5) $\quad$ (5, 2) $\quad$ (–2, 5) $\quad$ (2, 5) $\quad$ (–2, –5)

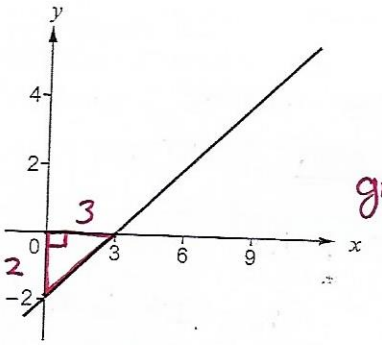
check

$x = 2$ $\quad$ $2y = 3x + 4$

$y = 5$ $\quad$ $2(5) = 3(2) + 4$

$10 = 6 + 4$ ✓

(c)



From the triangle

gradient = $\frac{\text{height}}{\text{base}}$

$= \frac{2}{3}$

slope / so $+\frac{2}{3}$

What is the gradient of the line shown in the graph above?
Circle your answer. [1]

$\frac{3}{2}$ $\quad$ $-\frac{3}{2}$ $\quad$ $\frac{2}{3}$ $\quad$ $-\frac{2}{3}$ $\quad$ -6

14. A **whole** number is written on a card.

Examiner only

You are given three clues to help you work out the number on the card.

Clue 1 : **Double** the number is between 8 and 18 inclusive.

Clue 2 : The number is a prime number.

Clue 3 : The number is **not** a factor of 100.

8 and 18 are ok!

What is the number on the card?
You must show all your working.

[3]

clue 1 4, (5) 6, (7), 8, 9

clue 2 from the list above
prime numbers 5 or 7

clue 3 not a factor of 100
• must be 7

The number on the card is 7

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15. In the following formulae, each measurement of length is represented by a letter.

Consider the dimensions implied by the formulae.
Write down, for each case, whether the formula could be for a length, an area, a volume or none of these.

The first one has been done for you. [3]

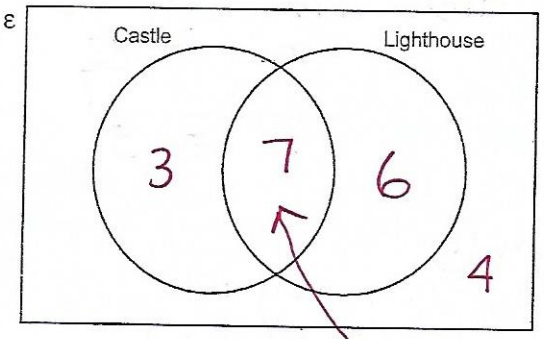
Formula	Formula could be for
$d^3 - 3{\cdot}14r^2h$	volume
$d^2 + hw$ d x d area + area	area
$d + w + h$	perimeter (length)
$2\pi r - \pi r^2$	none
$\underbrace{d \times w}_{\text{area}}$ $(d + h)w$	area
$d^3 + dwh$ d x d x d Vol + Vol	volume

Examine only

16. A group of 20 people visited Anglesey for a weekend break.

- 10 of the group visited Beaumaris Castle.
- 13 of the group visited South Stack Lighthouse.
- 4 of the group did not visit either of these places.

(a) Complete the Venn diagram below to show this information.
The universal set, ε, contains all of the 20 people in the group. [3]



Guess what number goes in the middle
If you get it wrong have another guess
until you guess right.

(b) One person is chosen at random from the group.
What is the probability that this person visited only one of the two places? [2]

Just castle = 3
Just Lighthouse = 6
} 9 people

$\therefore P(\text{Just one place}) = \frac{9}{20}$

Examiner only

17. Solve the following simultaneous equations using an algebraic (not graphical) method. [4]

$3x + 4y = 7$ — (1) $\times 3$
$2x - 3y = 16$ — (2) $\times 4$

$9x + 16y = 21$
$8x - 12y = 64$

ADD $17x = 85$

$x = \frac{85}{17}$ $\quad \begin{array}{r} 17 \\ \times 5 \\ \hline 85 \end{array}$

$x = 5$

From (1)

$3x + 4y = 7$

$3(5) + 4y = 7$

$15 + 4y = 7$

$4y = 7 - 15$

$4y = -8$

$y = \frac{-8}{4}$

$y = -2$

$x = 5$
$y = -2$ } Answer.

Examiner only

18. Calculate the value of $(5{\cdot}41 \times 10^5) + (2{\cdot}3 \times 10^4)$.
Give your answer in standard form. [2]

$541{,}000 + 23{,}000$

$= 564{,}000$

$= 5{\cdot}64 \times 10^5$

19. Rashid owned n sheep.
Eifion had exactly 4 times as many sheep as Rashid.

Rashid buys 17 extra sheep.
Eifion sells 8 of his sheep.

Eifion still has more sheep than Rashid.

Form an inequality, in terms of n.
Solve the inequality to find the **least** value of n.
You must show all your working. [5]

Rashid — Eiffion

n sheep — $4n$ sheep

17 extra $n+17$ — $4n-8$ ← 8 sheep sold.

Eiffion has more sheep than Rashid

$4n-8 > n+17$

$4n-n > 17+8$

$3n > 25$

$n > \frac{25}{3}$

$n > 8\frac{1}{3}$

Least n value is 9

END OF PAPER