**Practising how to explain your understanding – 2020**

**These get increasingly difficult so DO NOT STRESS if you cannot finish – this is all about practice.**

**Q1.**

The numbers in this sequence increase by 10 each time.

3        13        23        …

The sequence continues in the same way.

Write **two** numbers from the sequence that add to make a total of **96**

****

1 mark

Explain why it is **not** possible to find **three** numbers from the sequence that add to make a total of **96**



1 mark

**Q2.**

Amy did a survey of what time people get up on a Sunday morning.
This table shows her results for 150 people.

|  |  |  |
| --- | --- | --- |
|   | Time | number of people |
|   | before 7 am | 13 |
|   | 7:00 am to 7:59 am | 28 |
|   | 8:00 am to 8:59 am | 59 |
|   | 9:00 am to 9:59 am | 36 |
|   | 10 am and after | 14 |

Look at the table.

How many people get up at **8 am or later**?



1 mark

Amy says,

***'Two-thirds of the 150 people in the survey get up before 9 am.'***

Amy is correct.

Explain how you know.



1 mark

**Q3.**

Anna says  is greater than 

Explain why Anna is correct.



1 mark

**Q4.**

|  |  |
| --- | --- |
| The diagram shows a pentagon.Not drawnaccurately |   |

Each side of the pentagon is the **same length.**

Is the shape a **regular** pentagon?

**Yes** or **No**.

Explain your answer.



1 mark

Work out the size of angle *a*



2 marks

**Q5.**

Is  greater than ?

Circle **Yes** or **No**.

Yes / No

Show how you know.



1 mark

Is  half of ?

**Yes** or **No**.

 Show how you know.



1 mark

**Q6.**

The rule for this sequence of numbers is **‘add 3 each time’.**

**1     4     7    10     13     16   ...**

The sequence continues in the same way.

Mary says,

          ***‘No matter how far you go there will never be a multiple of 3 in the sequence’.***

Is she correct?
**Yes  /  No**

Explain how you know.



1 mark

**Q7.**

Leila knows that

65 × 3 = 195

Explain how she can **use this information** to find the answer to this multiplication:

165 × 3



1 mark

**Q8.**

Three children do a sponsored silence.

This is a chart of the money they collected.



Estimate how much **Sheena** collected.



1 mark

Together **Gary** and **Pip** collected **more than £60**

Explain how the **chart** shows this.



1 mark

**Q9.**

Kelly chooses a **section** of a newspaper.

It has **50 words** in it.

She draws a bar chart of the number of letters in each word.



What **fraction** of the 50 words have **more than 6 letters**?



1 mark

Kelly says,

***23 of the 50 words have less than 5 letters. This shows that nearly half of all the words used in the newspaper have less than 5 letters in them.***

Explain why she **could be wrong.**

****

1 mark

**Q10.**

This sequence of numbers **goes up by 40** each time.

40     80     120     160     200     ...

This sequence continues.

Will the number **2140** be in the sequence?

Circle **Yes** or **No**.                                                     Yes  /  No

Explain how you know.



1 mark

**Q11.**

Megan says,

***‘If two rectangles have the same perimeter,
they must have the same area.’***

Is she correct?
**Yes** or **No**.

Explain how you know.



1 mark

**Q12.**

If you know **40%** of a number, explain how you could work out the original number.



1 mark

**Q13.**

Lisa is using trial and improvement to find a solution to this equation.

|  |  |
| --- | --- |
|   | *x*2 – 3*x* = 1 |

Here are her first few trials.

Complete the missing information.

When *x* = **3**, *x*2– 3*x* =      0      , so this value of *x* is too    small

When *x* = **4**, *x*2– 3*x* =              , so this value of *x* is too

1 mark

When *x* = **3.5**, *x*2– 3*x* =              , so this value of *x* is too

1 mark

What value of *x* should Lisa try next?

*x =*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain why you chose that value.



1 mark

**M1.**(a)        Two numbers from the sequence that total 96, eg:

43 **AND** 53

**OR**

23 **AND** 73

*Numbers may be given in either order.*

*Accept negative numbers, eg −7* ***AND*** *103*

**1**

(b)     An explanation that recognises that adding three numbers ending in 3
will produce a number ending in a 9 eg:

■        ‘They all end in 3 so adding three will give a number ending in 9’

■        ‘If you add three numbers in the sequence you will always get a
number ending in 9’

■        ‘All the numbers are odd and 96 is even’

***Do not*** *accept vague or incomplete explanations, eg:*

*■   ‘All the numbers end in three’*

*■   ‘It only works with two numbers’*

*■   ‘3 odds add to make an even’*

**U1**

**[2]**

**M2.**          (a)     109

**1**

(b)     An explanation that recognises that 100 people get up before 9am
which is two-thirds of the total (150).

■        ‘13 + 28 + 59 = 100 which is two-thirds of the total’

■        ‘ of 150 = 50 and 2 × 50 = 100’

■        ‘ of 150 is 100’

■        ‘36 + 14 = 50 which is one-third after 9am’

***Do not*** *accept vague or incomplete explanations, eg:*

*■   ‘One-third are 9 o’clock or later’*

*■   ‘100 got up at 9am’*

*■   ‘Twice as many got up before 9am.’*

*■   ‘13 + 28 + 59 = 100’*

**U1**

**[2]**

**M3.**Gives a correct explanation that converts the given fractions to decimals **or** fractions with a common denominator / numerator **or** percentages, eg:

•         =  but  = 

•        0.57142… > 0.55555

•        Because there is a  difference between the two

*For  accept:*

*•        0.57(...)* ***or*** *57(. ...%)*

*For  accept:*

*•        0.56* ***or*** *0.55(...)* ***or*** *56(%)* ***or*** *55(. ...%)*

*Accept minimally acceptable explanations, eg:*

*•       *

*•    0.56  0.57*

***Do not accept*** *incomplete explanations that fail to convert both fractions to a common format, eg:*

*•     is 0.57 so it is bigger*

*•    9ths are smaller than 7ths and there is only one more 9th*

*than 7th so  is greater*

*! Condone method of conversion incorrectly expressed in an otherwise correct explanation, eg:*

*•     × 9 = *

**[1]**

**M4.**         Indicates No and gives a correct explanation

eg

•        The angles are not the same size

•        A regular pentagon looks like this, with its angles all the same size

•        All the angles should be 108°

•        It doesn’t have rotation symmetry

•        It’s got more sides than a square so all its angles should be obtuse, but they’re not

**1**

60°

**2**

Shows that the 150° angle can be split into 90° and 60°

***or***

Divides the pentagon vertically and shows that half *a* is 30°

or

Draws triangles to show a rectangle, labelling the non-right angles on at least one side correctly eg

•      

or

Shows or implies that the angle sum of a pentagon is 540°

**1**

*Accept minimally acceptable explanation eg •        90 ≠ 150 •        Different angles •        A regular pentagon doesn’t have right angles in it •        A regular one can’t have 150° angles •        It doesn’t look the same when it’s turned •        Not all the angles are obtuse*

*! Incorrect angle size for a regular pentagon given Condone alongside a correct response eg, accept •        The angles are different, they should be 60° (error, but all equal implied) •        The angles should all be 70° (error) eg, do not accept •        The 90° angles should be 60° (does not imply the angles should all be the same)*

***Do not accept*** *incomplete explanation eg •        Not the same •        It has two right angles •        Two angles are the same*

*•        A regular pentagon looks like this *

*•        A regular pentagon doesn’t have any vertical lines*

*! Indicates Yes, or no decision made, but explanation clearly correct
Condone provided the explanation is more than minimal*

**[3]**

**M5.**         (a)     Indicates **Yes** and gives a correct explanation, eg:

•         = ,  

•

•         of 9 is 3 not 4

•         should be , not 

•        0.33...

•         = ,  

•         of 27 = 9 and  of 27 = 12

*Accept minimally acceptable explanation, eg:*

*•        *

*•        , *

*•        4 is over a third of 9*

*•         of 9 is 3*

*•         is closer to a half than a third*

*•        0.33, 0.44*

*•        It is one ninth bigger*

*•        If you divide  by a  you get *

*•        *

*! Inaccuracies in diagrams*

*Throughout the question, condone provided the pupil’s intention to divide into thirds, ninths and/or eighteenths is clearly shown, and the correct sections are shaded*

*! Indicates* ***No****, or no decision made, but explanation clearly correct*

*Condone provided the explanation is more than minimal*

***Do not accept*** *incomplete or incorrect explanation, eg:*

*•        If you draw a pie chart for  , more than  is shaded*

*•        Put them into 27ths and  > *

*•         × 3 = *

**1**

**U1**

(b)     Indicates **No** and gives a correct explanation, eg:

•        The fractions are equal; if you multiply the numerator and denominator by the same number the fractions are equivalent

•         = 

•         × 2 =  not 

•         ÷ 2 =  which is  not 

•        To double the fraction, you don’t double the numerator and the denominator, you just double the numerator

•        To halve the fraction, you don’t halve the denominator, only the numerator

*Accept minimally acceptable explanation, eg:*

*•        Equal*

*•        Equivalent*

*•        Same*

*•         is half of *

*•         is half of *

*•        You only double the top number*

*•        You only halve the top number*

*! Indicates* ***Yes****, or no decision made, but explanation clearly correct*

*Condone provided the explanation is more than minimal*

***Do not accept*** *Incomplete explanation, eg*

*•        If you double the top and the bottom number of  ,         you get *

**1**

**U1**

**[2]**

**M6.**          Explanation which recognises that
each number is one more than a multiple of 3, eg

•    ‘It starts at 1 and keeps adding 3 so it misses all the multiples of 3’,

•    ‘Multiples of 3 are all 1 less than the numbers’.

*No mark is awarded for circling ‘Yes’ alone.*

***Do not*** *accept vague or arbitrary explanations such as*

*•    ‘They’re too big’;*

*•    ‘It doesn’t go far enough’;*

*•    ‘It is adding 3 all the time’.*

*If ‘No’ is circled but a correct unambiguous explanation is given then award the mark.*

**[1]**

**M7.**          Explanation which indicates that 300 can be added to 195, eg

•    ‘It’s 3 × 100 more’;

•    ‘You add another 300 on’;

•    ‘3 × 65 = 195, 3 × 100 = 300 so it’s 495’;

•    ‘100 has been added to 65, so multiply 100 by 3 and add it to 195’.

*An answer to the multiplication is not required and* ***no mark*** *is awarded for it.*

***Do not*** *accept vague answers such as:*

*•    ‘You work it out’;*

*•    ‘Do a sum’;*

*•    ‘It’s nearly the same except it has 100 in front of it’.*

**[1]**

**M8.**          (a)     Answer in the range of £43 to £44 inclusive.

**1**

(b)     Explanation which implies that Gary has an amount greater than £25 but less
than £27.50 and that Pip has £351, so that their total is greater than £60, eg

•    ‘Gary has 26 Pip has 35’;

•    ‘The chart shows that Gary has 2 and 2/3 and Pip has 3 and a half, so that’s
over 60 pounds’;

•    ‘The whole symbols together make 50 and then it’s 2 halves and Pip has
half and Gary has more than half’.

***Do not*** *accept vague or arbitrary answers, eg*

*•    ‘By the number of coins’;*

*•    ‘There are 5 ten pounds and 2 halves’;*

*•    ‘A coin = 10 pounds and a broken coin = a fraction of a
     coin so a fraction of the money’.*

**1**

**[2]**

**M9.**          (a)     1/5 **OR** 10/50

*Accept other equivalent fractions, eg: 20/100*

**1**

(b)     Explanations which imply that the results from a small sample cannot safely
be applied to a large one, eg:

•    ‘You could be wrong because every section is different’

•    ‘The article is only a small proportion of the whole newspaper’

•    ‘The rest could be different’

•    ‘You can’t judge a whole newspaper by one article’

***Do not*** *accept vague or arbitrary explanations such as:*

*‘She might not have counted right’;
‘The words in the newspaper might be big’;
‘There are more bigger words than small’.*

**1**

**[2]**

**M10.**          Explanation which recognises that the numbers in the sequence are multiples of 40 and that 2140 is not **OR** that only the even hundreds in the sequence have the numbers ending in 40, eg

•    ‘it doesn’t divide by 40’;

•    ‘140 isn’t in it so 2140 won’t be’;

•    ‘it will go 2000, 2040, 2080, 2120, 2160 ... so there’s no 2140’.

***No mark*** *is awarded for circling ‘No’ alone.*

*Do not accept vague or arbitrary explanations, eg*

*•    ‘It’s odd, so it won’t be there’;*

*•    ‘It’s not part of the sequence’.*

**[1]**

**M11.**Indicates No and gives a correct explanation that
includes indicating two different areas, eg:

•        A rectangle with sides 6 cm by 2 cm has a perimeter of 16 cm and
an area of 12 cm2 but a rectangle with sides 5 cm and 3 cm has
the same perimeter of 16 cm but it has an area of 15 cm2 which
is different so she is not correct

•        A square with sides 3 cm by 3 cm and a rectangle with sides 4 cm
by 2 cm have the same perimeter of 12 cm but they have different
areas of 9 cm2 and 8 cm2

*Accept minimally acceptable explanation, eg:*

*•    6 × 2 = 12, 5 × 3 = 15*

*•
*

*! Ignore any incorrect units given in an
otherwise correct explanation, eg:*

*•    62 for 6 cm2*

*! Indicates Yes, or no decision made, but
explanation clearly correct*

*Condone, provided the explanation is more
than minimal*

***Do not accept*** *Incomplete or incorrect explanation, eg:*

*•    6 × 2, 5 × 3*

*•    Two rectangles, one with sides 6 cm by
5 cm and one with sides 8 cm by 3 cm have
the same perimeter of 22 cm but they don’t
have the same area*

*•
*

**[1]**

**M12.**          An explanation which recognises that 40% of the number must be
multiplied by 2, or equivalent, eg:

•    ‘You multiply by 2.5’

•    ‘Halve it and multiply by 5’

•    ‘Divide by 4 to get 10% and then multiply by 10’

•    ‘Divide by 40 then multiply by 100’

•    ‘If you had 100, quarter of 100 is 25, then times by 10 to get 250’

•    ‘Double it and add half of it’.

***Do not*** *accept vague or incomplete explanations, eg:*

*•    ‘Start with the original number and find 40% of it’*

*•    ‘Find 10% and multiply by 10’*

*•    ‘Divide by 4 to find 10% and then you can find 100%’*

*•    ‘Find 1% and multiply by 100’*

*•    ‘If you had 20 it would be 50’*

*•    ‘Add 60%’*

**U1**

**[1]**

**M13.**         Gives correct information for *x* = 4, eg

•      4, too big

•      4, too high

•      4, too much above 1

***Do not accept*** *incomplete information that does not link to the value of 1, eg •      4, too incorrect*

**1**

Gives correct information for *x* = 3.5, eg

•      1.75, too big

*! In both the first and second answers, shows correct values but omits or gives incorrect further information, eg •      4, too small 1.75, too \_\_\_\_\_\_\_\_\_\_ Do not award the first mark, but award the second mark*

*! Value rounded Accept 1.8 Do not accept 1.7*

**1**

Gives a logical value for the next trial, and justifies their decision, eg

•      3.2, because I know it is between 3 and 3.5

•     3.25, it is half way between 3 and 3 and a half

•     3.3 because it is bigger than 3 which was too small but smaller than 3.5 which was too big

•      3.4, it has to be smaller than 3.5 (that it is greater than 3 is implicit)

*! Logical values Accept any of the following:       3.1       3.2       3.3       3.4       3.25 Also accept any value between 3.3 and 3.4 provided their justification shows why the solution is between these values eg, accept (since a further trial has clearly taken place) •      3.35, 3.3 is too small •      3.302, because 3.303 is just over 1 eg, do not accept •      3.35, because I know it is between 3 and 3.5*

*Accept minimally acceptable justification, eg •      3.2, 3.5 is too big*

***Do not accept*** *incomplete justification, eg •      3.3, it gets closer to 1 •      3.25 because it is at an appropriate interval*

*! For the third part, follow-through If their calculation in the second part for x = 3.5 was too small, accept x = 3.6, 3.7, 3.75, 3.8 or 3.9 alongside an explanation comparable with those given in the mark scheme*

**1**

**[3]**