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| Year 8 | | *Linear Relations* | Non Calculator  Section |
| **Skills and Knowledge Assessed:**   * Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178) * Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193) * Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176) | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *Answer all questions in the spaces provided on this test paper by:*  *Writing the answer in the box provided.*  *or*  *Shading in the bubble for the correct answer from the four choices provided.*  *Or*  *Completing a diagram.*  *Show any working out on the test paper. Calculators are* ***not*** *allowed.* | | | |
|  | Mark and label the points K (-4, -3) and  L (-3, 2) on the number plane. | | |
|  | Write down the ordered pairs that describe the position of the points *P* and *Q.*  ( , )  *P*  ( , )  *Q* | | |
|  | Mark and label the points R (  ,  ) and  S (  ,  ) on the number plane. | | |
|  | Write down the ordered pairs for the points M and N*.*  ( , )  M  ( , )  N | | |
|  | Questions 5 – 6 refer to the following:  The rule  describes a relationship between x and y values. | | |
|  | Use the rule  to complete the table of ordered pairs below.     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 0 | 2 | 3 | 5 | |  |  |  |  |  | | | |
|  | Plot the points from the table on the grid. | | |
|  | Which rule could be used to describe the ordered pairs in the table below?   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 3 | 4 | 6 | |  | 2 | 6 | 8 | 12 | | | |
|  | Questions 8 – 9 refer to the following:  The rule  describes a relationship between *x* and *y* values. | | |
|  | Use the rule to complete the table of ordered pairs below.     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 | 4 | |  |  |  |  |  | | | |
|  | Plot the points from the table on the grid. | | |
|  | Questions 10 – 13 refer to the pattern of numbers below. | | |
|  | What number would be at position 4 in the pattern? | | |
|  | What number would be at position 9 in the pattern? | | |
|  | Complete the statement below.  Number = **×** the position in the pattern - | | |
|  | What position in the pattern would have a value of 28? | | |
|  | Complete the table for .     |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 1 | 2 | | *y* |  |  |  | | | |
|  | Questions 15 and 16 refer to the equation | | |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 2 | | *y* | 5 |  |  |   Complete the table of ordered pairs for the equation  . | | |
|  | Use the ordered pairs to graph the line  on the number plane. | | |
|  | Which equation describes the ordered pairs in the table shown?   |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 1 | | *y* | -1 | 2 | 5 | | | |
|  | Draw the line represented by  on the graph. | | |

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| Year 8 | | *Linear Relations* | Calculator Allowed  Short Answer  Section |
|  | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *Answer all questions in the spaces provided on this test paper by:*  *Writing the answer in the box provided.*  *or*  *Shading in the bubble for the correct answer from the four choices provided.*  *Show any working out on the test paper. Calculators are allowed.* | | | |
|  | Mark and label the points *H* (3.5, 4.5) and  *I* (-4.5, 0) on the number plane. | | |
|  | Give the ordered pairs that describe the points *A* and *B* below.    ( , )  *A*  ( , )  *B* | | |
|  | Questions 3 – 6 refer to the diagram below, where matchsticks are used to make the first 3 steps in a pattern.      *Step 1 Step 2* *Step 3*  6 matches 10 matches 14 matches | | |
|  | How many matches are needed to produce *Step 4* of the pattern?  15 16 17 18 | | |
|  | Draw what *Step 5* of the pattern would look like. | | |
|  | How many matches would be needed to make *Step 8* of the pattern?  matches. | | |
|  | Describe in words the pattern that gives the number of matches for a given step.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
|  | Complete the table for the equation   |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 0.5 | 1 | | *y* |  |  |  | | | |
|  | Plot the ordered pairs from the table on the graph provided.     |  |  |  |  | | --- | --- | --- | --- | |  | 1.5 | 3.5 | 5.5 | | *y* | 4 | 6 | 8 | | | |
|  | Draw the line which represents the equation  Three ordered pairs have been calculated in the table.   |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 2 | 4 | | *y* | 3 | 6 | 9 | | | |
|  | Which equation describes the ordered pairs in the table shown?   |  |  |  |  | | --- | --- | --- | --- | |  | 0.5 | 1 | 1.5 | | *y* | 3 | 2 | 1 | | | |
|  | Which line represents the equation | | |
|  | Which is the equation of the line shown | | |
|  | Write the equation of the line shown  *y =* | | |
|  | The lines with equation  and  are  both horizontal lines. horizontal and vertical lines respectively.  both vertical lines. vertical and horizontal lines respectively. | | |

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|  | ***Question 15 – 18 refer to the information below.***  The Giants football club is recruiting members. The graph below shows the number of members the club has over the 7 weeks of a recruiting drive. |
|  | How many members were there when the recruiting drive started?  15 20 25 30 |
|  | How many members would there be in *Week 7*, if this pattern of recruitment is continued?  members. |
|  | On the graph mark the number of members in *Weeks 5, 6* and *7* following this pattern. |
|  | Describe in words the relationship between the number of weekss and the number of members.  Members = × *Number of weeks +* |

Linear Relations

ANSWERS

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| Non Calculator Section ( 1 mark each) |

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| Q no |  | Answer |
|  |  | See Graph |
|  | P(-3, 5) Q(0,-7) | P(-3, 5) Q(0,-7) |
|  |  | See graph |
|  |  |  |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 0 | 2 | 3 | 5 | |  | 4 | 6 | 7 | 9 | | See table |
|  |  | See graph |
|  |  | 2nd Answer |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 | 4 | |  | 1 | 4 | 7 | 10 | |  |
|  |  |  |
|  | Increasing by 6, so next is 22. | 22 |
|  | Add another 5 lots of 6 to 22 gives 52. | 52 |
|  | Number = 6 × the position in the pattern  2 |  |
|  | 22 plus 6 gives 28, so the 5th position | 5th Position |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 1 | 2 | | *y=5-2x* | 5 | 3 | 1 | | See table |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 2 | | *y* | 5 | 4 | 2 | |  |
|  |  |  |
|  | works for all values given | 3rd Answer |
|  |  | See graph |

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| Calculator Allowed Short Answer Section ( 1 mark each) |

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| Q no |  | Answer |
|  |  |  |
|  | A(-1.5, -0.5) B( 0, 3.5) | A(-1.5, -0.5)  B( 0, 3.5) |
|  | Goes up by 4 each time, so step 4 is 18 | 4th Answer |
|  | Step 5 | See drawing |
|  | Step 5 has 22, Step 6 has 26; Step 7 has 30 and Step 8 has 34. | 34 |
|  | Various possible descriptions; Examples are:  *The pattern starts with 6 matches at step 1 and goes up by 4 matches for each new step.*  *Multiply the step number by four and add 2 to get the number of matches.* | Various see examples |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 0.5 | 1 | | *y* | 2.5 | 3.5 | 4.5 | | See table |
|  |  |  |
|  |  |  |
|  | works for all values in the table. | 1st Answer |
|  | Use  Sub *x*=0 gives *y* = 3, so only 2nd and 3rd.  Sub *x*=1 gives *y* = 5 so only 2nd. | 2nd Answer |
|  | Take ordered pairs from the graph and sub values into equations.  *x*=0, *y* = 10 First 3 work.  *x*= 1, *y* = 7, only the 3rd one works. | 3rd Answer |
|  | Read off some ordered pairs.   |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 1 | 2 | | *y* | 5 | 7 | 9 |   *y* goes up by 2 for each increase of 1 in *x*.  When *x* = 0, *y* = 5. |  |
|  | is a vertical line and  is a horizontal line. | 4th Answer |
|  | Week 0 has 15 members | 1st Answer |
|  | Starts at 15 and goes up by 5 each week, so after 7 weeks increased by  so total numbers are | 50 |
|  |  |  |
|  | Members = *5*  × *Number of weeks + 15* | 5  15 |

