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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.*  Show any working out on the test paper.Calculators are **not** allowed. | | | |
|  | Mark and label the points *D* (-2, -3) and  *E* (3, -2) on the number plane. | | |
|  | Write down the ordered pairs that describe the position of the points *S* and *T.*  ( , )  *S*  ( , )  *T* | | |
|  | Mark and label the points *V*  (  ,  ) and  *W*  (  ,  ) on the number plane. | | |
|  | Write down the ordered pairs for the points *G* and *H.*  ( , )  *G*  ( , )  *H* | | |
|  | Use the rule  to complete the table of ordered pairs below.     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 0 | 1 | 2 | 3 | |  |  |  |  |  | | | |
|  | Plot the points from the table in the previous question on the number plane. | | |
|  | Which rule could be used to describe the ordered pairs in the table below?   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 3 | 4 | 6 | |  | 5 | 7 | 8 | 10 | | | |
|  | Use the rule to complete the table of ordered pairs below.     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  | 0 | 1 | 2 | |  |  |  |  |  | | | |
|  | Plot the points from the table in question 8 on the number plane and draw the line which passes through them. | | |
|  | 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 8 in the pattern? | | |
|  | Complete the statement below.  Number = **×** the position in the pattern **+** | | |
|  | What position in the pattern would have a value of 24? | | |
|  | Complete the table for .     |  |  |  |  | | --- | --- | --- | --- | |  |  | 0 | 2 | |  |  |  |  | | | |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 2 | | *y* | 7 |  |  |   Complete the table of ordered pairs for the equation  . | | |
|  | Use the ordered pairs from question 15 to graph the line  on the number plane. | | |
|  | Which equation describes the ordered pairs in the table shown?   |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 1 | | *y* | 16 | 15 | 14 | | | |
|  | 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 *M* (4.5, -2.5) and  *N* (-4.5, 3.5) on the number plane. | | |
|  | Give the ordered pairs that describe the points *K* and *L* below.  ( , )  *K*  ( , )  *L* | | |
|  | 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*  5 matches 8 matches 11 matches | | |
|  | How many matches, in total, are needed to produce *Step 4* of the pattern?  12 13 14 15 | | |
|  | 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 | |  |  |  |  | | | |
|  | Plot the ordered pairs from the table on the graph provided.   |  |  |  |  | | --- | --- | --- | --- | |  | 2 | 2.5 | 3 | |  | 7 | 4 | 1 | | | |
|  | Draw the line which represents the equation  Three ordered pairs have been calculated in the table.   |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 1 | |  | 5 | 8 | 11 | | | |
|  | Which point does **not** lie on the line with equation | | |
|  | Which line represents the equation | | |
|  | Which is the equation of the line shown | | |
|  | Which equation describes the ordered pairs in the table shown?   |  |  |  |  | | --- | --- | --- | --- | |  | 2 | 4 | 6 | |  | 8 | 7 | 6 | | | |
|  | Write the equation of the line shown | | |
|  | The lines shown are :  and  and  and  and | | |

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|  | ***Question 16 – 18 refer to the information below.***  The mass of a piece of timber with given cross section is related to its length.  The graph below shows the relationship between the mass and length of a certain size of timber. |
|  | What is the mass of a piece of timber which is 8 metres long?  2.6 kg 8 kg 16 kg 20 kg |
|  | A piece of this timber has a mass of 25 kilograms.  What is its length? |
|  | Write down an equation that links *l* and *m* for this size of timber. |

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| Year 8 | | *Linear Relations* | Non Calculator  Section |
| ANSWERS | | | |
| No. | WORKING | | ANSWER |
|  |  | | See graph |
|  | *S* (6, 8)  T (-4, 0) | | *S* (6, 8) T (-4, 0) |
|  |  | | See graph |
|  | *G*  *H* | | *G*  *H* |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 0 | 1 | 2 | 3 | |  | 0 | 3 | 6 | 9 | | | See table |
|  |  | | See graph |
|  |  | | 2nd answer |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  | 0 | 1 | 2 | |  | 3 | 5 | 7 | 9 | | | See table |
|  |  | | See graph |
|  | The numbers increase by 3 each time, so 4th would be 15. | | 15 |
|  | Position 8 would be 4 more lots of 3 along in the pattern. | | 27 |
|  | Number = 3 × the position in the pattern + 3. | | 3 goes in both boxes |
|  | 24 is 15 + 9 so 4th term plus 3 lots of 3.  4th term plus 3 more is 7th position | | 7th Position |
|  | |  |  |  |  | | --- | --- | --- | --- | |  |  | 0 | 2 | |  | 13 | 10 | 4 | | | See table |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 2 | |  | 7 | 5 | 1 | | | See table |
|  |  | | See graph |
|  |  | | 3rd answer |
|  |  | | See graph |

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| Year 8 | | *Linear Relations* | Calculator Allowed  Short Answer  Section | |
| ANSWERS | | | | |
| No. | WORKING | | | ANSWER |
|  |  | | | See graph |
|  | *K*  *L* | | | *K*  *L* |
|  | Increases by 3 each time, so 11 + 3 = 14 | | | 3rd answer |
|  |  | | | See diagram |
|  | Step 5 is 17, step 8 is 3 more steps along, so 3 lots of 3 more | | | 26 |
|  | Various possible descriptions; Examples are:  *The pattern starts with 5 matches at step 1 and goes up by 3 matches for each new step.*  *Multiply the step number by 3 and add 2 to get the number of matches.* | | | See examples |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 0.5 | 1 | |  | -6 | -5 | -4 | | | | See table |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | 2 | 2.5 | 3 | |  | 7 | 4 | 1 | | | | See graph |
|  |  | | | See graph |
|  |  | | | 3rd answer |
|  | When x = 0, y = 6  When x = 2, y = 7 | | | 1st answer |
|  | When *x* = 0, *y* = 4  When *x* = 1, *y* = 6 | | | 2nd answer |
|  | Substituting points into the equations gives | | | 4th answer |
|  | Read off some ordered pairs.   |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 1 | 2 | | *y* | -2 | 1 | 4 |   *y* goes up by 3 for each increase of 1 in *x*.  When *x* = 0, *y* = -2. | | |  |
|  | Vertical line through 6 is  and horizontal line is | | | 1st answer |
|  | From graph when *l* = 8, *m* = 20 | | | 4th answer |
|  | From graph when *m* = 25, *l* = 10 | | | 10 metres |
|  |  | | |  |