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| *School Name*  *Mathematics Test 2017* | | | |
| 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 *P* (4, -2) and  *Q* (-3, 4) on the number plane. | | |
|  | Write down the ordered pairs that describe the position of the points *S* and *T.*  ( , )  *R*  ( , )  *S* | | |
|  | Mark and label the points *U*  ( , ) and  *T*  ( , ) on the number plane. | | |
|  | Write down the ordered pairs for the points *A* and *B.*  ( , )  *A*  ( , )  *B* | | |
|  | Use the rule  to complete the table of ordered pairs below.     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | -1 | 1 | 3 | 5 | |  |  |  |  |  | | | |
|  | Plot the points from the table in the previous question on the number plane and join them to form a line. | | |
|  | Which rule could be used to describe the ordered pairs in the table below?   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 3 | 4 | 6 | |  | 3 | 1 | 0 | –2 | | | |
|  | Use the rule to complete the table of ordered pairs below.     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | -1 | 1 | 2 | 4 | |  |  |  |  |  | | | |
|  | 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 terms in the pattern of numbers below. | | |
|  | What would term number 4 be in the pattern? | | |
|  | What would term number 8 be in the pattern? | | |
|  | Complete the statement below.  Term = **×** Term number – | | |
|  | What term in the pattern would have a value of 23? | | |
|  | Complete the table for .     |  |  |  |  | | --- | --- | --- | --- | |  |  | 0 | 2 | |  |  |  |  | | | |
|  | |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | *y* |  |  |  |   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?   |  |  |  |  | | --- | --- | --- | --- | |  | -2 | 0 | 2 | | *y* | –9 | –5 | –1 | | | |
|  | What equation would describe the line on the graph below? | | |

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|  | | | 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 this test paper. Calculators are allowed. | | | |
|  | Mark and label the points *M* (-2.5, -3.0) and  *N* (-0.5, 1.5) on the number plane. | | |
|  | Give the ordered pairs that describe the points *E* and *M* below.  ( , )  *E*  ( , )  *M* | | |
|  | **Questions 3 – 6 refer to the diagram below.**  Matchsticks are used to make the first 3 steps in a pattern.      *Step 1 Step 2* *Step 3*  3 matches 7 matches 11 matches | | |
|  | How many matches, in total, are needed to produce *Step 4* of the pattern?  12 13 15 16 | | |
|  | 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 | 2 | 5 | |  |  |  |  | | | |
|  | Plot the ordered pairs from the table on the graph provided.   |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 4 | 7 | |  | 7 | 5 | 3 | | | |
|  | Draw the line which represents the equation  Three ordered pairs have been calculated in the table.   |  |  |  |  | | --- | --- | --- | --- | |  | -1 | 0 | 3 | |  | -6 | -4 | 2 | | | |
|  | 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 | 2 | 4 | |  | –1 | 19 | 29 | | | |
|  | Write the equation of the line shown | | |
|  | The lines shown are :  and  and  and  and | | |
|  | **Question 16 – 18 refer to the information below.**  The cost of buying perfume from a mail order company, depends on the amount bought.  The graph below shows the relationship between the amount of perfume and the cost. | | |
|  | What is the cost of 120 ml of perfume?  $55 $60 $65 $70 | | |
|  | What amount of perfume could be bought for $100? | | |
|  | Write down an equation that links A and C in this graph. | | |

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ANSWERS

| Question | Working and Answer |
| --- | --- |
|  |  |
|  | *R* (-6, -4)  T (0, -4) |
|  |  |
|  | *A*  *B* |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | -1 | 1 | 3 | 5 | |  | –6 | –4 | –2 | 0 | |
|  |  |
|  | **4th Answer** |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | -1 | 1 | 2 | 4 | |  | –5 | 1 | 4 | 10 | |
|  |  |
|  | The numbers increase by 4 each time, so 4th would be **15.** |
|  | Position 8 would be 4 more lots of 4 along in the pattern. |
|  | Term =  **4**  × Term Number –  **1.** |
|  | 23 is 15 + 8 so 4th term plus 2 lots of 4.  4th term plus 2 more terms is 6th term |
|  | |  |  |  |  | | --- | --- | --- | --- | |  |  | 0 | 2 | |  |  |  | 6 | |
|  | |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |  | 10 | 7 | 4 | |
|  |  |
|  | **2nd Answer** |
|  | The *x* value of every ordered pair is 5, so *x* = 5  **1st Answer** |

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ANSWERS

|  |  |
| --- | --- |
| Question | Working and Answer |
|  |  |
|  | *E*  *M* |
|  | Increases by 4 matches each time, so 11 + 4 =15  **3rd Answer** |
|  | It has 19 matches |
|  | Step 5 is 19, step 8 is 3 more steps along, so 3 more lots of 4 |
|  | Various possible descriptions; Examples are:  *The pattern starts with 3 matches at step 1 and goes up by 4 matches for each new step.*  *Multiply the step number by 4 and take away 1 to get the number of matches.* |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 2 | 5 | |  | **5** | **11** | **20** | |
|  | |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 4 | 7 | |  | 7 | 5 | 3 | |
|  |  |
|  | **2nd Answer** |
|  | When *x* = 0, *y* = 6  When *x* = 3, *y* = 6 – 1 = 5  **3rd Answer** |
|  | When *x* = 0, *y* = 7, fits first 2 and last equations  When *x* = 1, *y* = 8 fits only the first equation  **1st Answer** |
|  | Substituting points into the equations gives  **4th Answer** |
|  | Read off some ordered pairs.   |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 1 | 2 | | *Y* | –4 | 1 | 6 |   *y* goes up by 5 for each increase of 1 in *x,* so equation is *y = 5x +b*.    When *x* = 0, *y* = –4, so –4 = 5×0 +*b* so *b =*–4. |
|  | Vertical line through  is  and horizontal line through 5 is  **2nd Answer** |
|  | From graph when *A* = 120, *C* = 70  **4th Answer** |
|  | From graph when *C* = 100, *A* = 180  So **180 ml could be bought**. |
|  |  |