# School Name

# Mathematics Test 2017

Year 8

# Linear Relations

**Non Calculator Section**

Name_____

**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)

Answer all questions in the spaces provided on this test paper by:

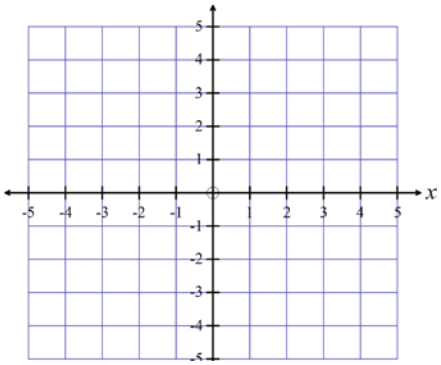
*Writing the answer in the box provided.*

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.

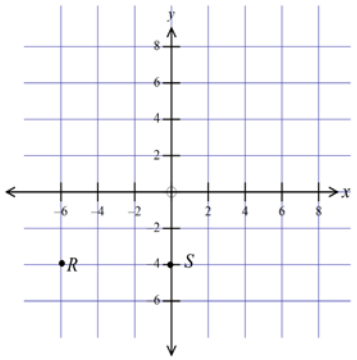
1. Mark and label the points *P* (4, -2) and *Q* (-3, 4) on the number plane.



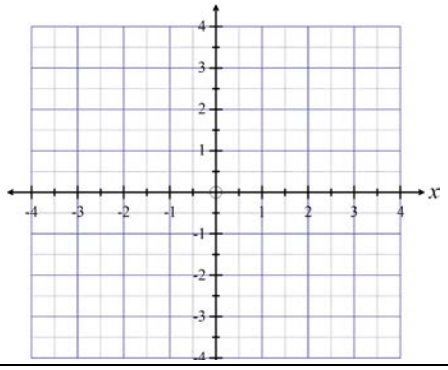

2. Write down the ordered pairs that describe the position of the points *S* and *T*.

*R* ( , )

*S* ( , )



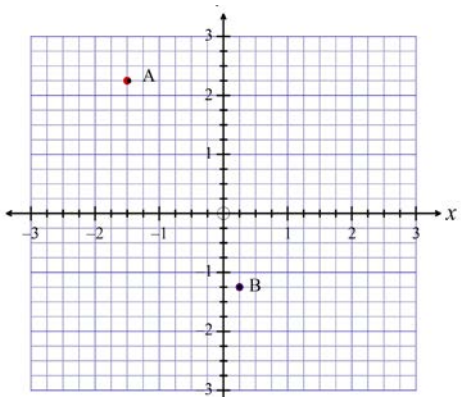
3. Mark and label the points $U\ (2\frac{1}{2}\ ,\ 1\frac{1}{2})$ and $T\ (-3\frac{1}{2}\ ,\ 0)$ on the number plane.




4. Write down the ordered pairs for the points *A* and *B*.

*A* ( , )

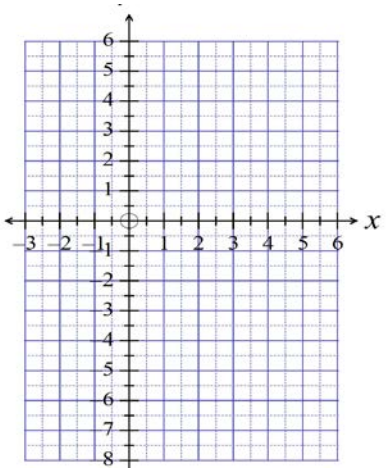
*B* ( , )




5. Use the rule $y = x - 5$ to complete the table of ordered pairs below.

| $x$ | -1 | 1 | 3 | 5 |
|---|---|---|---|---|
| $y = x - 5$ | | | | |

6. Plot the points from the table in the previous question on the number plane and join them to form a line.



7. Which rule could be used to describe the ordered pairs in the table below?

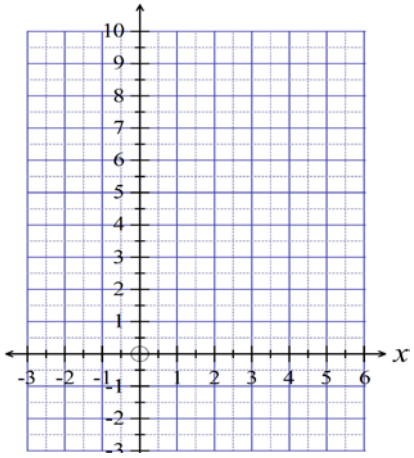
| $x$ | 1 | 3 | 4 | 6 |
|---|---|---|---|---|
| $y$ | 3 | 1 | 0 | –2 |

☐ $y = x + 4$ ☐ $y = x - 4$ ☐ $y = 4x$ ☐ $y = 4 - x$

8. Use the rule to complete the table of ordered pairs below.

| $x$ | -1 | 1 | 2 | 4 |
|---|---|---|---|---|
| $y = 3x - 2$ | | | | |

9. 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.

| Term Number | Term |
|---|---|
| 1 | 3 |
| 2 | 7 |
| 3 | 11 |
| 4 | |

10. What would term number 4 be in the pattern?

11. What would term number 8 be in the pattern?

12. Complete the statement below.

Term = ☐ × Term number – ☐

13. What term in the pattern would have a value of 23?

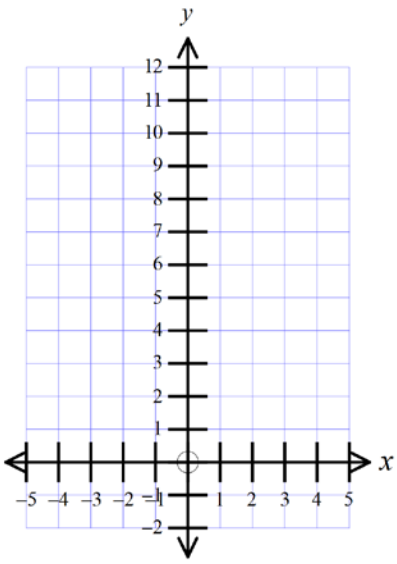
14. Complete the table for $y = 5x - 4$.

| $x$ | –1 | 0 | 2 |
|---|---|---|---|
| $y = 5x - 4$ | | | |

15. Complete the table of ordered pairs for the equation $y = 7 - x$ .

| $x$ | –3 | 0 | 3 |
|---|---|---|---|
| $y$ | | | |

16. Use the ordered pairs from question 15 to graph the line $y = 7 - x$ on the number plane.

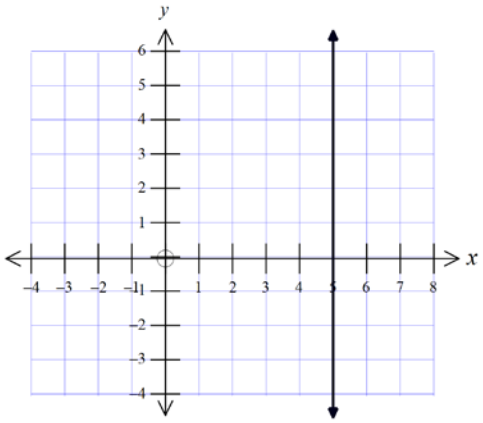


17. Which equation describes the ordered pairs in the table shown?

| $x$ | -2 | 0 | 2 |
|---|---|---|---|
| $y$ | –9 | –5 | –1 |

☐ $y = 2x + 5$ ☐ $y = 2x - 5$ ☐ $y = 5x + 2$ ☐ $y = 5x - 2$

18. What equation would describe the line on the graph below?




☐ $x = 5$ ☐ $x = 5y$ ☐ $y = 5$ ☐ $y = 5x$

# School Name

# Mathematics Test 2017

## Linear Relations

Year 8

**Calculator Allowed**
**Short Answer Section**

Name_____

Answer all questions in the spaces provided on this test paper by:

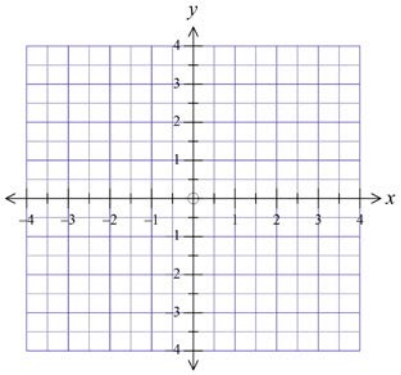
*Writing the answer in the box provided.*

or

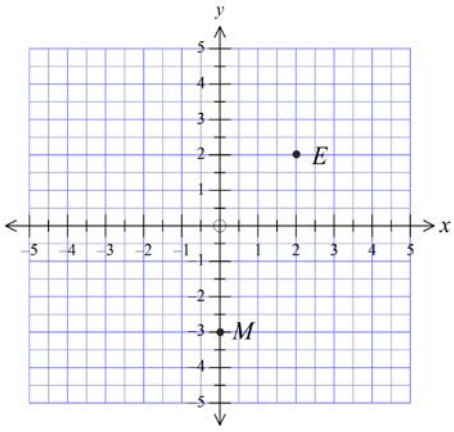
*Shading in the bubble for the correct answer from the four choices provided.*

Show any working out on this test paper. Calculators are allowed.

1. Mark and label the points *M* (-2.5, -3.0) and *N* (-0.5, 1.5) on the number plane.




2. Give the ordered pairs that describe the points *E* and *M* below.

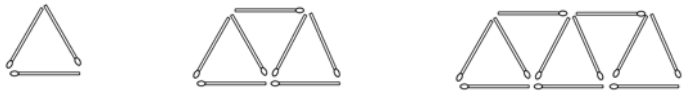



*E* ( , )

*M* ( , )

**Questions 3 – 6 refer to the diagram below.**

Matchsticks are used to make the first 3 steps in a pattern.



*Step 1* 3 matches

*Step 2* 7 matches

*Step 3* 11 matches

3. How many matches, in total, are needed to produce *Step 4* of the pattern?

☐ 12 ☐ 13 ☐ 15 ☐ 16

4. Draw what *Step 5* of the pattern would look like.

5. How many matches would be needed to make *Step 8* of the pattern?

_____ matches.

6. Describe in words the pattern that gives the number of matches for a given step.

_____

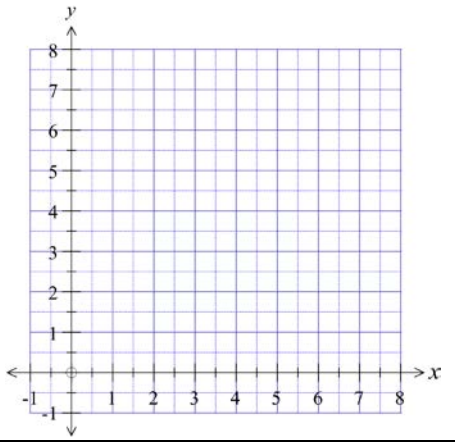
_____

7. Complete the table for the equation $y = 3x + 5$

| $x$ | 0 | 2 | 5 |
|---|---|---|---|
| $y$ | | | |

8. Plot the ordered pairs from the table on the graph provided.

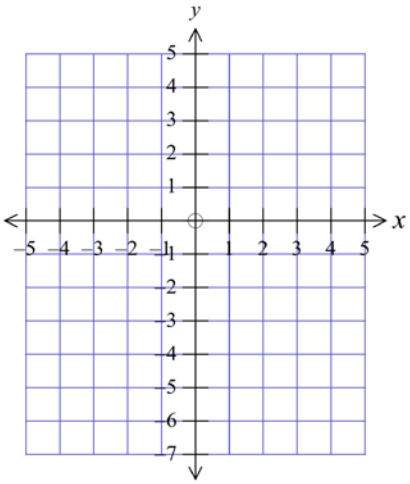
| $x$ | 1 | 4 | 7 |
|---|---|---|---|
| $y$ | 7 | 5 | 3 |



9. Draw the line which represents the equation $y = 2x - 4$

Three ordered pairs have been calculated in the table.

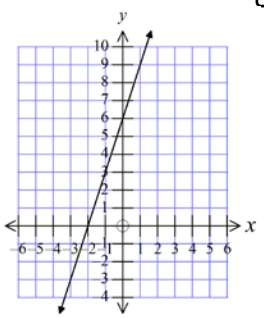
| $x$ | -1 | 0 | 3 |
|---|---|---|---|
| $y$ | -6 | -4 | 2 |

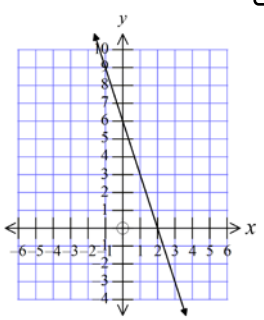


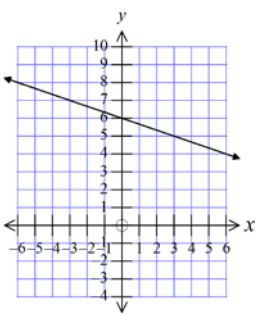
10. Which point does **not** lie on the line with equation $y = 30 - 4x$

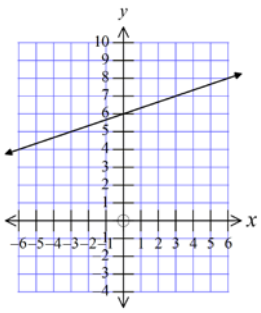
☐ (4, 14) ☐ (3, 12) ☐ (0, 30) ☐ (5, 10)

11. Which line represents the equation $y = 6 - \frac{x}{3}$ ?

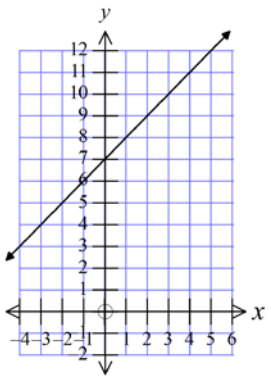
☐ 

☐ 

☐ 

☐ 

12. Which is the equation of the line shown



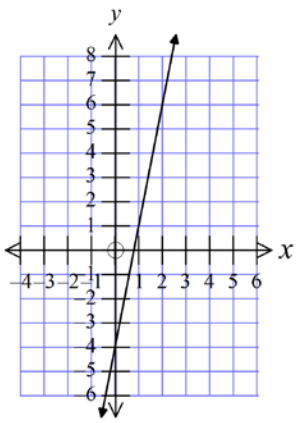
- ☐ $y = x + 7$
- ☐ $y = 7 - x$
- ☐ $y = 7x$
- ☐ $y = 2x + 7$

13. Which equation describes the ordered pairs in the table shown?

| $x$ | –2 | 2 | 4 |
|---|---|---|---|
| $y$ | –1 | 19 | 29 |

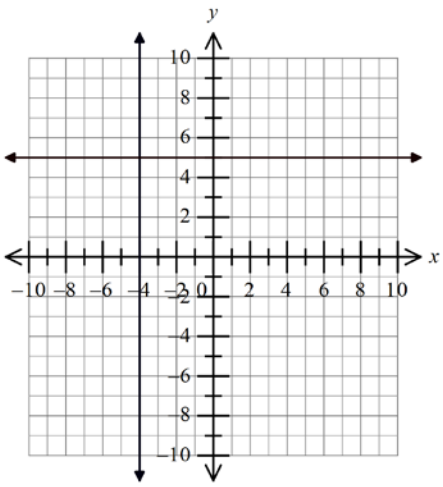
☐ $y = -5x - 11$ ☐ $y = 9 - 5x$ ☐ $y = 5x + 10$ ☐ $y = 5x + 9$

14. Write the equation of the line shown



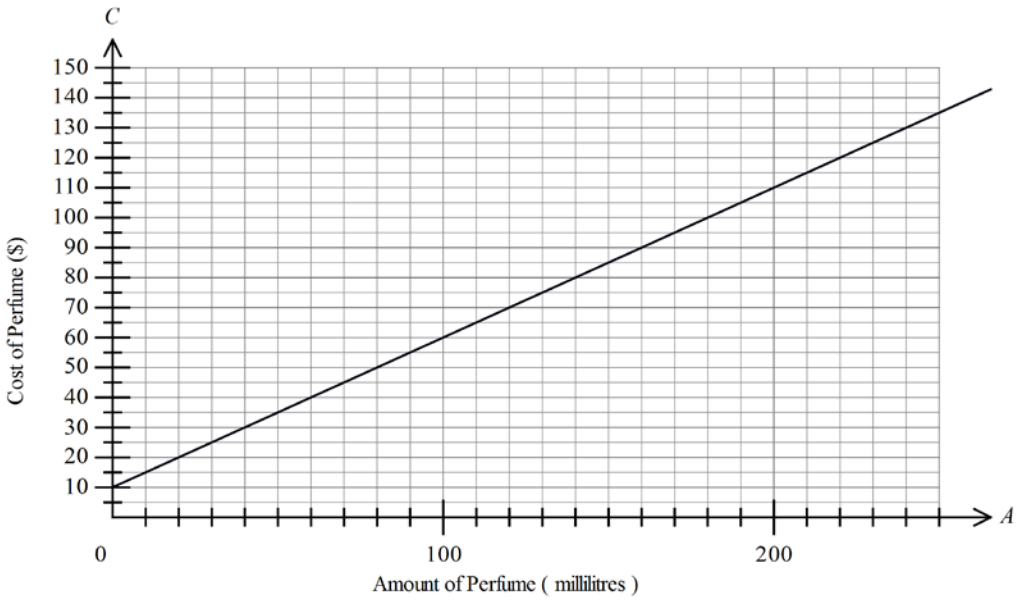
15. The lines shown are :

- ☐ $x = -4$ and $y = -5$
- ☐ $x = -4$ and $y = 5$
- ☐ $x = -5$ and $y = -4$
- ☐ $x = -5$ and $y = 4$



**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.




16. What is the cost of 120 ml of perfume?

☐ $55 ☐ $60 ☐ $65 ☐ $70

17. What amount of perfume could be bought for $100?

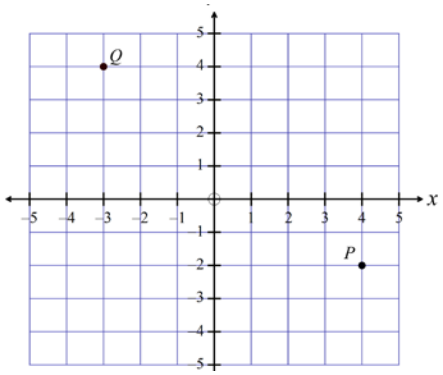
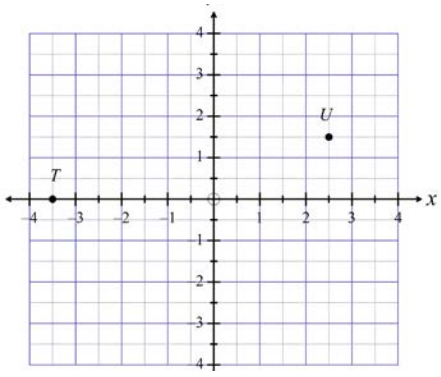
18. Write down an equation that links A and C in this graph.

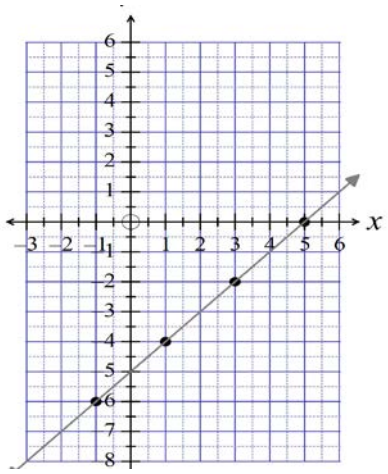
# School Name
# Mathematics Test 2017

Year 8 **Linear Relations**

Non Calculator Section

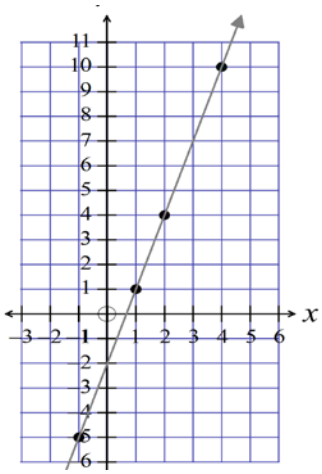
## ANSWERS

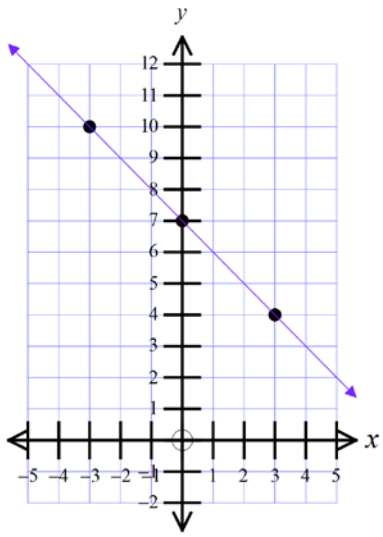
| Question | Working and Answer |
|---|---|
| 1. |   |
| 2. | *R* (-6, -4)<br>T (0, -4) |
| 3. |   |

| Question | Working and Answer |
|---|---|
| 4. | $A\left(-1\frac{1}{2}, 2\frac{1}{4}\right)$<br>$B\left(\frac{1}{4}, -1\frac{1}{4}\right)$ |
| 5. | |
| 6. |  |
| 7. | $y = 4 - x$<br>**4th Answer** |
| 8. | |

| $x$ | -1 | 1 | 3 | 5 |
|---|---|---|---|---|
| $y = x - 5$ | –6 | –4 | –2 | 0 |

| $x$ | -1 | 1 | 2 | 4 |
|---|---|---|---|---|
| $y = 3x - 2$ | –5 | 1 | 4 | 10 |

<table>
<tr><th>Question</th><th>Working and Answer</th></tr>
<tr><td>9.</td><td> 
</td></tr>
<tr><td>10.</td><td>The numbers increase by 4 each time, so 4th would be 15.</td></tr>
<tr><td>11.</td><td>Position 8 would be 4 more lots of 4 along in the pattern.<br>$15 + 4 \times 4 = 15 + 16 =$ 31.</td></tr>
<tr><td>12.</td><td>Term = 4 × Term Number − 1.</td></tr>
<tr><td>13.</td><td>23 is 15 + 8 so 4th term plus 2 lots of 4.<br>4th term plus 2 more terms is 6th term</td></tr>
<tr><td>14.</td><td><table>
<tr><td>$x$</td><td>−1</td><td>0</td><td>2</td></tr>
<tr><td>$y = 5x - 4$</td><td>−9</td><td>−4</td><td>6</td></tr>
</table></td></tr>
<tr><td>15.</td><td><table>
<tr><td>$x$</td><td>−3</td><td>0</td><td>3</td></tr>
<tr><td>$y = 7 - x$</td><td>10</td><td>7</td><td>4</td></tr>
</table></td></tr>
</table>

| Question | Working and Answer |
|---|---|
| 16. |  |
| 17. | $y = 2x - 5$<br>**2nd Answer** |
| 18. | The $x$ value of every ordered pair is 5, so $x = 5$<br>**1st Answer** |

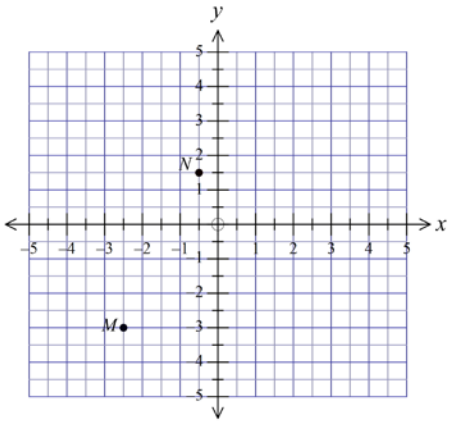
# School Name
# Mathematics Test 2017

## Linear Relations

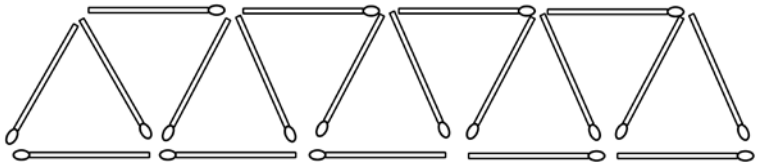
Year 8

Calculator Allowed
Short Answer
Section

# ANSWERS

| Question | Working and Answer |
|---|---|
| 1. |   |
| 2. | *E* **(2, 2)**<br>*M* **(0, –3)** |
| 3. | Increases by 4 matches each time, so 11 + 4 =15<br>**3rd Answer** |

**4.**



It has 19 matches

**5.**

Step 5 is 19, step 8 is 3 more steps along, so 3 more lots of 4

$19 + 3 \times 4 = 19 + 12 = \mathbf{31}$

**6.**

Various possible descriptions; Examples are:

*The pattern starts with 3 matches at step 1 and goes up by 4 matches for each new step.*

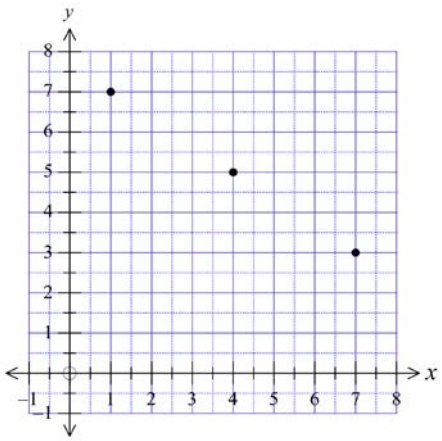
*Multiply the step number by 4 and take away 1 to get the number of matches.*

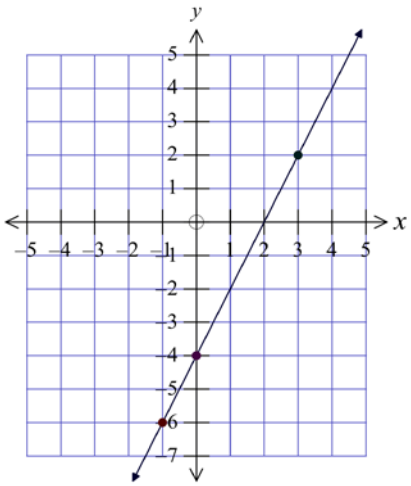
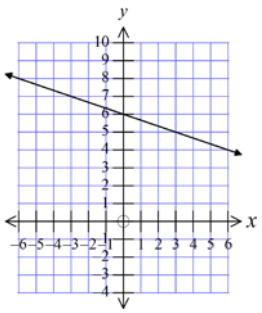
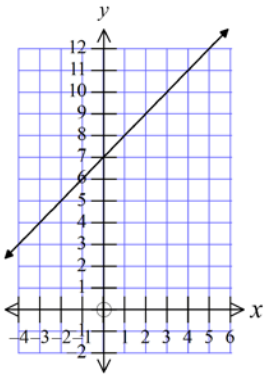
**7.**

| $x$ | 0 | 2 | 5 |
|---|---|---|---|
| $y = 3x + 5$ | **5** | **11** | **20** |

**8.**

| $x$ | 1 | 4 | 7 |
|---|---|---|---|
| $y$ | 7 | 5 | 3 |



| | |
|---|---|
| 9. |  |
| 10. | $(3, 12)$ $y = 30 - 4 \times 3$<br>$= 30 - 12$<br>$= 18 \neq 12$<br>**2nd Answer** |
| 11. | $y = 6 - \frac{x}{3}$<br>When $x = 0$, $y = 6$<br>When $x = 3$, $y = 6 - 1 = 5$<br>**3rd Answer**<br>  |
| 12. |  <br>When $x = 0$, $y = 7$, fits first 2 and last equations<br>When $x = 1$, $y = 8$ fits only the first equation<br>**1st Answer** |
| 13. | Substituting points into the equations gives $y = 5x + 9$<br>**4th Answer** |

| | |
|---|---|
| 14. | Read off some ordered pairs.<br><br>$x$ \| 0 \| 1 \| 2<br>$Y$ \| –4 \| 1 \| 6<br><br>$y$ goes up by 5 for each increase of 1 in $x$, so equation is $y = 5x + b$.<br><br>When $x = 0$, $y = -4$, so $-4 = 5\times0 + b$ so $b = -4$.<br><br>$\boldsymbol{y = 5x - 4}$ |
| 15. | Vertical line through $-4$ is $x = -4$ and horizontal line through 5 is $y = 5$<br>**2nd Answer** |
| 16. | From graph when $A = 120$, $C = 70$<br>**4th Answer** |
| 17. | From graph when $C = 100$, $A = 180$<br>So **180 ml could be bought**. |
| 18. | $\boldsymbol{C = \frac{A}{2} + 10}$ |