

Patterns & Algebra

Unit Test

Name: _____

Date: _____

Section A

1. Replace the variable with the given value and evaluate. (This is called substitution.)

a) $11m + 7$, $m = 8$

b) $127 - 12z$, $z = 4$

c) $6n + 2n + 12$, $n = 5$

2. Find the number that makes each equation true (by guessing and checking) and write it in the box.

a) $\square + 6 = 9$

b) $73 - \bigcirc = 6$

c) $68 - \triangle = 21$

d) $81 \div \bigcirc = 9$

e) $6 \times \square = 48$

f) $5.5 + \triangle = 8.7$

g) $7 \times \diamond = 42$

h) $\square - 5.9 = 13$

i) $\diamond \div 5 = 8$

j) $5 + 17 = 6 + \bigcirc$

k) $78 - 6 = \square + 15$

l) $\square + \square + 7 = 59$

3. Solve each equation by working backwards. Show all your steps.

a) $x - 18 = 19$

b) $m + 5 = 6.4$

c) $a - 1.4 = 3.8$

d) $n \div 7 = 9$

e) $4y = 48$

f) $12 + 3z = 57$

g) $3n + 4 = 46$

h) $5x - 4 = 66$

i) $24 - 3y = 9$

j) $26h + 21 = 125$

4. Write an algebraic expression for each sentence.

a) Four less than a number.

b) A number decreased by 18.

c) The product of 7 and a number.

d) The sum of a number and 12.

e) Two more than a number.

f) A number divided by 8.

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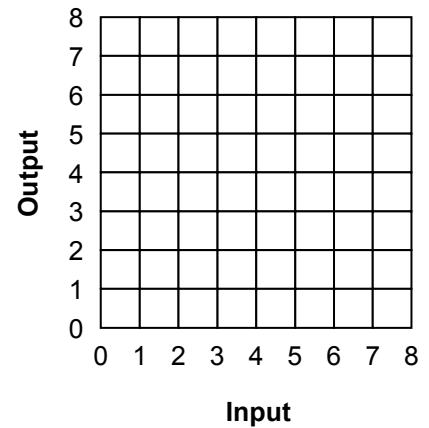
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Section A (continued)

5. a) Write a list of ordered pairs based on the T-table provided.

Input	Output
1	8
2	6
3	4
4	2



b) Draw a graph for the T-table.

c) On the same grid, plot the following ordered pairs: (0, 1), (4, 5), (6, 7).
Join the points with a line.

d) Write the coordinates of the point where the lines intersect.

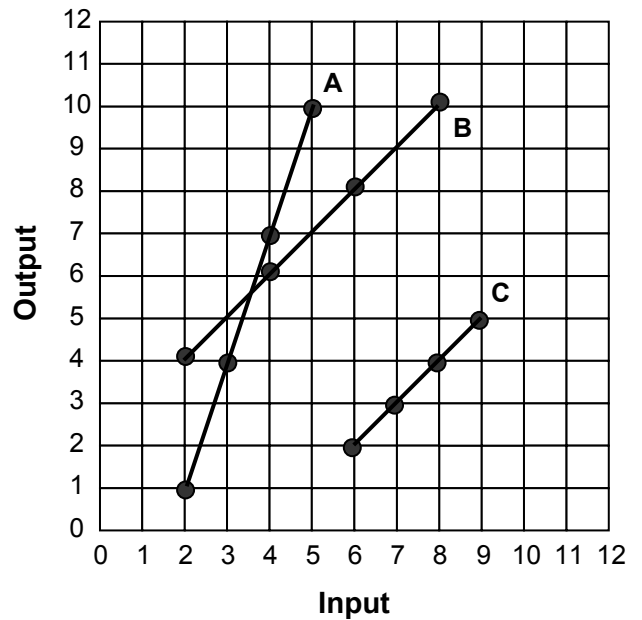
6. Make a T-table for each set of points on the coordinate grid. Then, write a rule for each T-table.

Graph A

Graph B

Graph C

Input	Output	Input	Output	Input	Output



Rule for Table A: _____

Rule for Table B: _____

Rule for Table C: _____

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Section B

7.

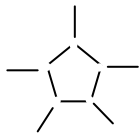


Figure 1

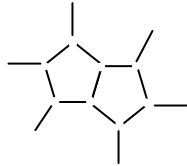


Figure 2

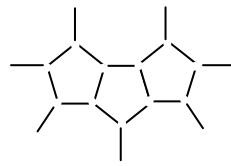


Figure 3

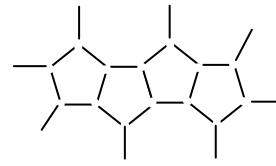


Figure 4

- Write a sequence of numbers that gives the number of toothpicks.
- Write an algebraic expression for the number of toothpicks.

8. Each container holds an equal number of marbles.



Write and solve an equation to find the number of marbles in each container, if the total number of marbles is:

- 39 marbles.
- 60 marbles.

9. Find a rule and algebraic expression (using n for the term number) for the following sequences.

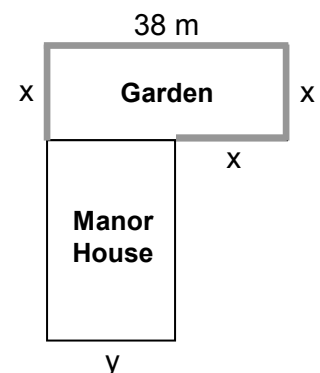
- 3, 15, 27, 39
- 9, 24, 39, 54
- 18, 17, 16, 15

10. Write an equation for each sentence, then solve it.

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> A number increased by 2.9 is 4.5 If you take the product of a number with 3 and then subtract 6, the result is 15. | <ol style="list-style-type: none"> A number decreased by 38 is thirteen. Five times a number is ninety-five. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|

11. A fence (shown in grey) has length 80 m.

- Find x .
- Find the width of the manor house (y).
- The manor house is twice as long as it is wide. The estate consists of the manor house and the garden.
Find the perimeter and area of the estate.



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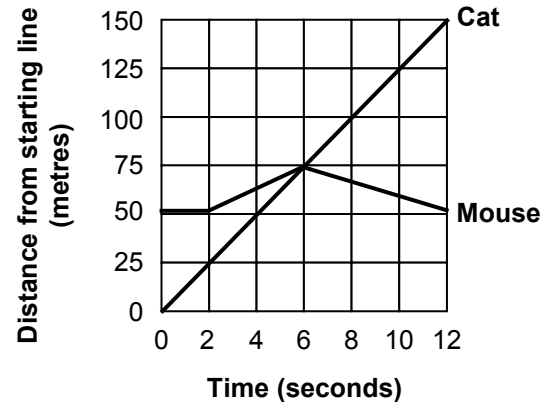
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Section B (continued)

12. On grid paper, make a T-table and graph for each of the following rules:
- a) Multiply by 5 and subtract 4. b) Multiply by 3 and add 1. c) Divide by 3 and subtract 1.

13. A mouse sees a cat running towards it and runs away.

- a) How far did the cat run in 10 seconds?
 b) How long did it take the mouse to see that it was being chased?
 c) How far was the mouse from the cat when the cat started running towards it?
 d) How many seconds after the cat started running did it overtake the mouse?
 e) Did the cat catch the mouse?



14. Lee has \$12 and plans to save \$5 every week.
 Wu has nothing, but she plans to save \$7 every week.

- a) How many weeks will it take before Wu has the same amount of money as Lee?
 b) Write a formula for the money each of them will have each week.
 c) How many weeks will it take before each of them has at least \$60?

15. a) Fill in the table. Extend the line to find the value of the 7th term.

Term Number	Term Value
1	1
	3
3	5
4	7
5	

- b) Find a rule and algebraic expression (using n for the term number) for the table.
 c) Use the algebraic expression to find the value of the 10th term.

