

## Year 7 Term 2 Homework

<b>Student Name:</b> _____	<b>Grade:</b> _____
<b>Date:</b> _____	<b>Score:</b> _____

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## 6 Year 7 Term 2 Week 6 Homework

### 6.1 Number Patterns and Pronumerals

#### 6.1.1 Algebraic Conventions

**Exercise 6.1.1** Write each product in index form.

1.  $2 \times a \times a \times a \times 4 =$  \_\_\_\_\_

2.  $b \times b \times 3 \times c \times b \times c =$  \_\_\_\_\_

3.  $5 \times a \times b \times b \times c \times b \times c =$  \_\_\_\_\_

4.  $7 \times x \times y \times x \times x =$  \_\_\_\_\_

5.  $d \times c \times 9 \times c \times d =$  \_\_\_\_\_

**Exercise 6.1.2** Write each of these divisions as a fraction.

1.  $a \times b \times c \div d =$  \_\_\_\_\_

2.  $8 \times b \times a \div c =$  \_\_\_\_\_

3.  $abc \div 2d =$  \_\_\_\_\_

4.  $2xy \div 5xz =$  \_\_\_\_\_

5.  $6pq \div 8rst =$  \_\_\_\_\_

**Exercise 6.1.3** Write each of these expressions without any multiplication or division signs.

1.  $7 \times (2 \times x + y \times 5) + z \times 4 =$  \_\_\_\_\_

2.  $3 \times a \times b \times (4 \times c + d - 5 \times e) - 1 =$  \_\_\_\_\_

3.  $(4 \times m - 5 \times n) \div (3 \times a \times b - b \times c \times 2 + d) =$  \_\_\_\_\_

4.  $3 \times (2 \times p \times q + q \times 2) \div 5 \times (4 \times p \times 3 \times q - 2 \times q) =$  \_\_\_\_\_

5.  $2 \times (a + 3 \times b - 4 \times c) \div [3 \times (b - 2 \times c) - (4 \times c + 3 \times b)] =$  \_\_\_\_\_

**6.1.2 Number Patterns**

Further numbers or terms in a number pattern can be found on two different ways:

- by finding a rule that relates each term to the previous term in the pattern.
- by finding a rule that related each to its position in the pattern.

**Exercise 6.1.4 Find a rule that relates the terms ( $T_n$ ) in each pattern to their position number (n), then find the 100th number on each pattern.**

1. 2, 5, 8, 11, 14, . . . \_\_\_\_\_  
\_\_\_\_\_

2. 19, 28, 37, 46, . . . \_\_\_\_\_  
\_\_\_\_\_

3. 6, 8, 10, 12, . . . \_\_\_\_\_  
\_\_\_\_\_

4. 9, 12, 15, 18, . . . \_\_\_\_\_  
\_\_\_\_\_

5. 4, 9, 14, 19, . . . \_\_\_\_\_  
\_\_\_\_\_

**Exercise 6.1.5 Further applications**

1. Consider the arithmetic sequence given: 3, 8, 13, 18, 23, . . . . Which term of the sequence is 108?  
\_\_\_\_\_  
\_\_\_\_\_

2. What is the next two numbers of the sequence? 73, 68, 70, 64, 66, 59, 61, \_\_\_\_\_ , \_\_\_\_\_

3. What is the next two numbers in the sequence? 4, 12, 36, 108, \_\_\_\_\_ , \_\_\_\_\_

4. Consider the geometric sequence given below: 5, 15, 45, 135, . . . Which term of the sequence equals 3645?  
\_\_\_\_\_  
\_\_\_\_\_

**6.1.3 Describing the relationship between two quantities****Exercise 6.1.6 Find a rule that could be used to generate each table of values:**

1.

$x$	1	2	3	4
$y$	24	12	8	6

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2.

$x$	7	6	5	4
$y$	15	14	13	12

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3.

$x$	3	4	5	6
$y$	7	14	23	34

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4.

$x$	1	2	3	4
$y$	22	19	16	13

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5.

$x$	1	2	3	4
$y$	18	16	14	12

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6.

$x$	1	2	3	4
$y$	17	13	9	5

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## 6.1.4 Table of values

**Exercise 6.1.7** Complete each of the following tables using the given expression.

1.  $y = 8 - 2x$

$x$	8	6	4	2	0
$y$					

2.  $y = 2x + 2$

$x$	0	1	2	3	4
$y$					

3.  $y = \frac{1}{2}x + 3$

$x$	2	4	6	8	10
$y$					

4.  $y = 4 - \frac{1}{2}x$

$x$	2	4	6	8	10
$y$					

5.  $y = 4x - 3$

$x$	1	2	3	4	5
$y$					

6.  $y = 4(x - 2)$

$x$	1	2	3	4	5
$y$					

7.  $y = (x + 2)^2$

$x$	1	2	3	4	5
$y$					

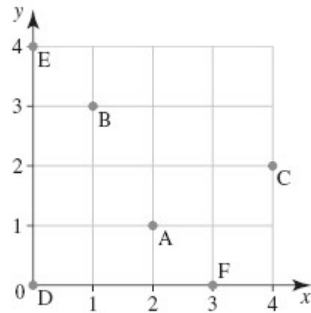
8.  $y = (x + 2)(x - 2)$

$x$	2	4	6	8	10
$y$					

**6.1.5 Representing relationship on a number grid**

A number grid is a two-dimensional grid drawn on a plane surface which consists of two perpendicular axes (x-axis and y-axis). The position of a point on the number grid is given as an **ordered pair** or a **pair of co-ordinates** in the form (x, y).

**Example 6.1.1 State the co-ordinates of each of these points**



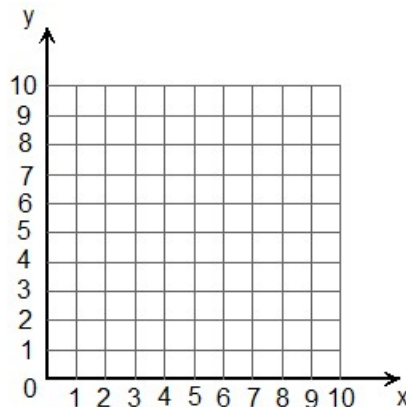
**Solution:**

- (i).  $A(2,1)$  ;    (ii).  $B(1, 3)$  ;    (iii).  $C(4, 2)$  ;    (iv).  $D(0, 0)$  ;    (v).  $E(0, 4)$  ;    (vi).  $F(3, 0)$

**Exercise 6.1.8 The number of matches (y) in each step (x) of a matches pattern is shown in this table of value.**

x	1	2	3	4	5
y	4	5	6	7	8

1. Plot these point on a number grid. Does it make sense to join the points? Explain.



2. What do you notice about the points?

\_\_\_\_\_

3. Write a rule for this number pattern.

\_\_\_\_\_

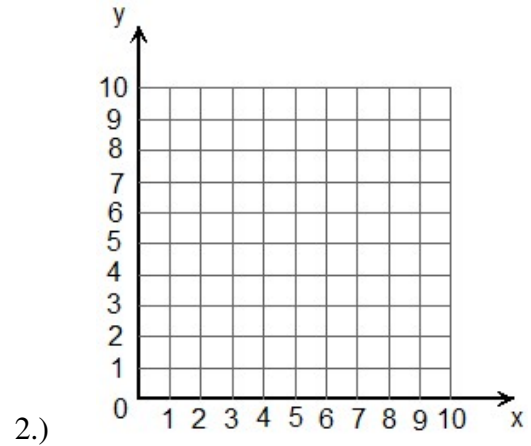
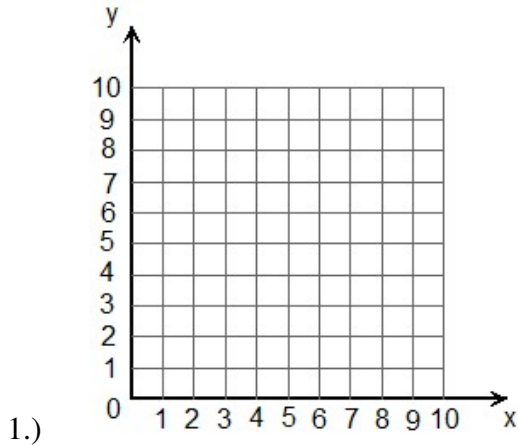
**Exercise 6.1.9** Graph each set of ordered pairs on a separate number grid.

1.

x	0	1	2	3	4
y	1	3	5	7	9

2.

x	2	3	4	5	6
y	0	2	4	6	8



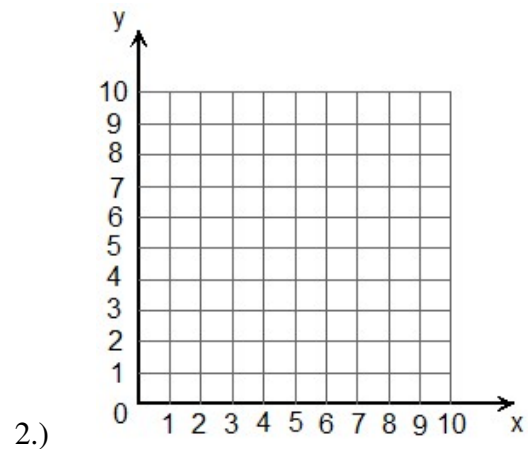
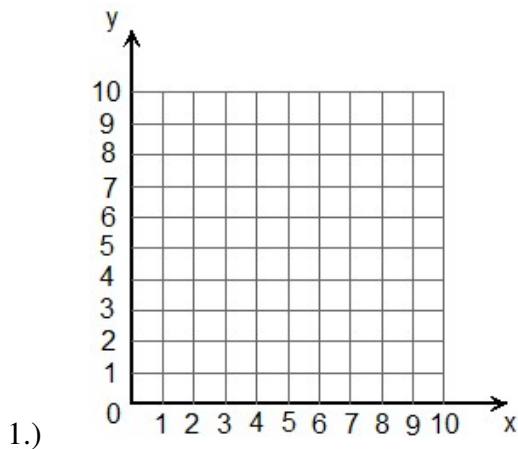
**Exercise 6.1.10** Complete each table of values using the given rule, then plot the points on a number grid.

1.  $y = 3x - 2$

x	1	2	3	4
y				

2.  $y = 6 - \frac{x}{2}$

x	2	4	6	8	10
y					



## 6.2 Problem Solving

### Exercise 6.2.1

1. In a 100 metre swimming race, John beat Paul by 10 metres. In another 100 metre race, Paul beat Andrew by 10 metres. If John raced Andrew, would he win by 20 metres if they swam at their usual speed?

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2. Twenty-seven small cubes have been stuck together to form a larger cube.

(a) Altogether, how many faces have glue on them?

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(b) How many faces do not have glue on them?

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3. 60% of the people in a train are men. The rest of the people are women, girls and boys in the ratio 5 : 2 : 9. There are a total of 440 children. How many more men than women are there in the train?

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### 6.3 Maths Challenge

#### Exercise 6.3.1

- Richard's piggy bank contains only 20-cent coins, 50-cent coins and \$1 coins. 78% of the coins are \$1 coins. The remainder are 20-cent coins and 50-cent coins in the ratio 8:3. There are 40 more 20-cent coins than 50-cent coins. Find the total value of all the coins in Richard's piggy bank.

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- A ship travels from A to B in 5 hours. If it travels from B to A, it will take 7 hours. Suppose the direction and the speed of the current remain constant. How long does it take for a raft floating along the water to go from A to B?

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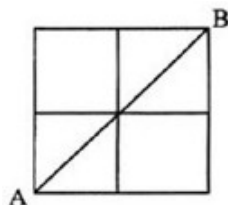


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- In how many ways can you get from A to B if you are only allowed to move from left to right or vertically or diagonally upwards.




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## 6.4 Miscellaneous Exercises

### Exercise 6.4.1

1. At Shell petrol station, the premium petrol cost  $\$p$  per litre which is 8 cents more than unleaded. How much does it cost to buy  $q$  litres of unleaded petrol (in terms of  $p$  and  $q$ )?

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2. The average age of Henry and Tony is  $6p$  years. Bob is  $12p$  years old. What is the average age of the 3 men?

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3. Flags are to be planted at equal intervals of 25 m along the perimeter of a racing track whose perimeter is 400 m. How many flag are needed?.

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4. In a maths test, the number of passes is 72 more than the number of failures. If 36 more students pass the test, the number of passes will be 5 times the number of failures. Find the total number of students who took the test.

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5. For every question Peter answered correctly in a quiz, he scored 8 points. 3 points were deducted for each incorrect answer. For every 10 questions Peter answered, 2 were incorrect. How many questions did he answer altogether if he scored a total of 290 points in the quiz?

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**Exercise 6.4.2**

1. A group of people paid a total of \$372 for a buffet dinner. The cost of the dinner for each adult is \$12, while that for a child is half price. If there were 5 more children than adults, how many children were at the dinner?

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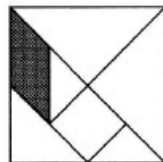


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2. The seven pieces in this 12 cm by 12 cm square make a Tangram set. What is the area of the shaded parallelogram?




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3. Judy has a total of 38 \$2 coins and \$1 coins in her piggyback. To total value of these coins is \$58. How many of coins of each type?

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4. Ken, Charles and David settled a bill of \$94.50 together after their lunch. Ken paid three times as much as Charles and Charles paid twice as much as David. How much must Charles and David have to return Ken if they were to share the cost of the lunch equally?

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**Exercise 6.4.3**

1. Nine bus stops are equally spaced along a bus route. The distance from the first to the third is 580 m. How far is it from the first to the last?

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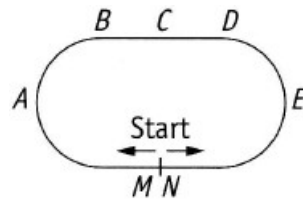


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2. Michael covers any distance in one-third of the times it takes Nicholas to run the same distance. They set off in opposite directions round the track as shown below. Where will they meet for the first time?




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3. A child's set of building blocks contains cubes, cones and spheres. Two cones and a sphere on one side of a pair of scales will just balance a cube on the other side; and sphere and a cube together will just balance three cones. How many spheres will just balance a single cone?

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4. A number of jellybeans was given to 100 children. Each boy was given 3 jellybeans. Each girl was given 8 jellybeans. The girls received a total of 338 jellybeans more than the boys. How many boys and girls were there?

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