

Year 7 Term 1 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

Table of contents

6 Year 7 Term 1 Week 6 Homework	1
6.1 Number Theory	1
6.1.1 Multiples	1
6.1.2 Pascal's Triangle	2
6.1.3 Factors	3
6.1.4 Prime and composite numbers	4
6.1.5 Prime factors	5
6.1.6 Problem solving	7
6.1.7 Diagnostic Test	8
6.2 Maths Challenge	10

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6 Year 7 Term 1 Week 6 Homework

6.1 Number Theory

6.1.1 Multiples

Exercise 6.1.1

1. Write down the 6th multiple of 5 _____
2. Write down the 9th multiple of 12 _____
3. Write down the 12th multiple of 8 _____
4. Write down the 7th multiple of 9 _____
5. Write down the 11th multiple of 15 _____
6. Write down the 12th multiple of 12 _____

Exercise 6.1.2

1. Which multiple of 11 is 110? _____
2. Which multiple of 12 is 96? _____
3. Which multiple of 7 is 63? _____
4. Which multiple of 8 is 112? _____
5. Which multiple of 6 is 156? _____
6. Which multiple of 9 is 135? _____

Exercise 6.1.3 Find all the multiples of:

1. 3 between 20 and 40 _____
2. 5 between 14 and 34 _____
3. 8 between 26 and 50 _____
4. 12 between 25 and 80 _____
5. 7 between 45 and 76 _____
6. 9 between 15 and 72 _____

6.1.2 Pascal's Triangle

The triangular pattern is named after a 17th-century French mathematician, Blaise Pascal.

Row	Sum of numbers
	1
1	1 1 2
2	1 2 1 4
3	1 3 3 1 8
4	1 4 6 4 1 ...
5	1 5 10 10 5 1 ...

Exercise 6.1.4

1. Continue the Pascal's triangle shown above for the next four rows.
 - (a) Use your calculator to find the value of 11^2 , 11^3 and 11^4 . Can you find your answers in the triangle? _____
 - (b) What is the second number in the seventh row? _____
 - (c) What do you think will be the second number in the fifteenth row? _____
2. What is the third number in the fourth row? _____
3. What is the third number in the fifth row? _____
4. What pattern do third numbers form in each row? _____
5. What is the third number in the fifteenth row? _____
6. What is the sum of:
 - (a) the first and second numbers in each row? _____
 - (b) the second and the third numbers in each row? _____
 - (c) numbers in each of the first, second, third, fourth, fifth and sixth row? _____

7. What pattern is do the sums of each row form?

6.1.3 Factors

- The factors of a number are the numbers that divide into it without remainder.
- The highest common factor (HCF) of two or more numbers is the largest number that divides into all of them.

Exercise 6.1.5 List all the factors of each of these numbers: (the number of factors is shown in brackets)

1. 36 [9] _____
2. 48 [10] _____
3. 66 [8] _____
4. 75 [6] _____
5. 42 [8] _____

Exercise 6.1.6

1. Find all the factors of 4, 9, 16 and 25.

2. Do square numbers have an odd or even number of factors? Why?

Exercise 6.1.7

1. If a number is divisible by 15, then it must be divisible by what other numbers?

2. If a number is divisible by 24, then it must be divisible by what other numbers?

Exercise 6.1.8 Find the HCF of these numbers:

1. 24, 28 and 48 _____
2. 42, 54 and 81 _____

6.1.4 Prime and composite numbers

- A prime number has only two factors - one and itself.
- A composite number has more than two factors.

Exercise 6.1.9 State whether these numbers are prime (P) or composite (C).

1. 2 _____
2. 5 _____
3. 15 _____
4. 33 _____
5. 37 _____
6. 51 _____
7. 13 _____
8. 47 _____

Exercise 6.1.10 Consolidation

1. List all the pairs of primes that differ by 10. _____

2. Can a square number be prime? _____
3. Which counting number is neither prime nor composite? Why?

4. Express 36 as the sum of four primes.

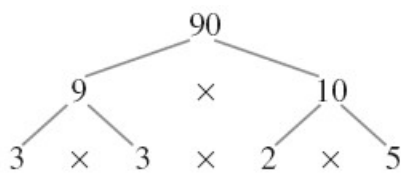
5. Find all pairs of prime whose sum is 100.

6.1.5 Prime factors

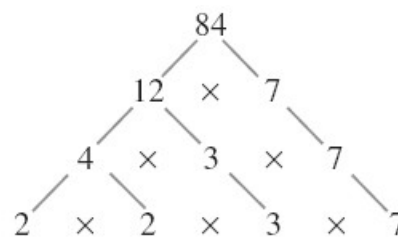
The highest common factor and lower common multiple of two or more numbers can be found by the use of their prime factors:

- To find the HCF of two numbers by prime factors: find the product of the prime factors that are common to both numbers.
- To find the LCM of two numbers by prime factors: find the product of all of the prime factors of the smaller number and those factors of the larger number that are not contained in the smaller one.

Example 6.1.1 Use the factor tree to express 90 and 84 as the product of its prime factors. Hence find their HCF and LCM.



Therefore, $90 = 2 \times 3^2 \times 5$



Therefore, $84 = 2^2 \times 3 \times 7$

$\therefore 90 = \boxed{2} \times \boxed{3} \times 3 \times 5$ *and*

$\therefore \text{The HCF} = 2 \times 3 = 6$

$84 = \boxed{2} \times 2 \times \boxed{3} \times 7$

$\therefore 90 = 2 \times 3 \times \boxed{3} \times \boxed{5}$ *and*

$\therefore \text{The LCM} = 2 \times 2 \times 3 \times 7 \times \boxed{3} \times \boxed{5}$

$= 2^2 \times 3^2 \times 5 \times 7$

$= 1260$

$84 = 2 \times 2 \times 3 \times 7$

Exercise 6.1.11 Draw a factor tree to express each number as the product of its prime factors. Give your answers in index form.

- 28 _____
- 54 _____
- 72 _____
- 100 _____
- 540 _____
- 1280 _____

Exercise 6.1.12 Find the HCF of each pair of numbers.

1. 216 and 2058

2. 216 and 324

3. 432 and 990

Exercise 6.1.13 Find the LCM of each pair of numbers.

1. 36 and 54

2. 54 and 68

3. 56 and 118

6.1.6 Problem solving

Exercise 6.1.14

1. *I think of a number between 10 and 50. It is a factor of 51. What is the number?*

2. *How many eighths are there in $4\frac{3}{4}$?*

3. *A 3-digit number gives a remainder of 5 when divided by 7. What is the smallest possible 3-digit number?*

4. *What is the product of the second multiple of 5 and the difference between 210 and 897?*

5. *Mike had some fifty-cent coins and twice as many twenty-cent coins. He exchanged all his twenty-cents for the same value of fifty-cent coins. He has 18 fifty-cent coins now. How many twenty-cent coins did he have at first?*

6.1.7 Diagnostic Test

1. Which number is a factor of every number? [5]

1. _____

2. If a number is divisible by 12, then it must be divisible by what other numbers? [5]

2. _____

3. Find the HCF of 24, 36 and 72. [5]

3. _____

4. Find the LCM of 12, 24 and 54. [5]

4. _____

5. Which factor of 12 other than 1 also a square number? [5]

5. _____

6. Which factor of 6 is also a multiple of 6? [5]

6. _____

7. Find the largest odd factor of 54. [5]

7. _____

8. Find the smallest even factor of 108. [5]

8. _____

9. What is the only even prime number? [10]

9. _____

10. What is the first odd composite number? [10]

10. _____

11. Find the largest 2-digit prime number. [10]

11. _____

12. What is the sum of the first 4 odd multiples of 15? [10]

12. _____

13. List the numbers smaller than 99 which have 3 and 8 as their factors. [10]

13. _____

14. Write down the smallest odd number which has only 3 factors. [10]

14. _____

6.2 Maths Challenge

Exercise 6.2.1 Percentage

1. In Australia you must pay a 10% GST on every item you purchase. In a sale, a 15% discount is offered on all items. Which would you prefer to have calculated first - discount or GST?

2. A car dealer bought two used cars but found himself short of money and had to resell them quickly. He sold them for \$15,000 each. One car he lost 20% but another one made a profit of 20%. Did he make or lose money on the whole deal? In either case, how much?

3. A car dealer bought a used car for \$5,000. He sells it to a customer at 25% profit. Some time later this customer sells the car back to the dealer at 25% loss. The dealer then sells it to another customer for \$4,800. How much profit did the car dealer make on this car altogether?

4. John sells an article to Ben at a profit of 20%. Ben sells the same article to Emma at a profit of 50%. If Emma pays \$270 for the article, for what price did John buy it?

5. A maths competition was entered by 80 boys and 70 girls. Prizes were awarded to 15% of the boys and six girls. What percentage of the competitor were prize winners?
