

Name: _____

Date: _____

Math 8 Honours Assignment 1.4 Prime Factorization and Number of Factors (Part 1)

1. Multiply the following without using a calculator:

a) $12 \times 16 =$

b) $15 \times 20 =$

c) $9 \times 16 \times 2 =$

d) $27 \times 4 =$

e) $14 \times 21 =$

f) $8 \times 12 \times 6 =$

g) $15 \times 12 \times 35 =$

h) $18 \times 14 \times 5 =$

i) $15 \times 24 \times 3 =$

2. Find the Prime Factorization for each of the following numbers without using a calculator:

a) 24

d) 845

g) 864

b) 1844

e) 3844

h) 5040

c) 20124

f) 12056

i) 454,597

3. Indicate which of the following are perfect squares:

a) 24, 36, 225, 169, 189, 224 _____

b) 16, 27, 72, 125, 289, 324 _____

c) -25, 900, 1024, 144, 54, -64 _____

4. Indicate which of the following products will be perfect squares:

a) $2^4 \times 3^2 \times 5^2 =$

b) $2^2 \times 3^4 \times 7^2 =$

c) $3^4 \times 3^3 \times 7^5 =$

d) $27 \times 24 \times 8 =$

e) $16 \times 36 \times 2 =$

f) $3 \times 12 \times 8 =$

g) $2 \times 2^2 \times 2^3 =$

h) $5 \times 5^4 \times 5^6 =$

i) $2^3 \times 3^4 \times 12^3 =$

5. Given that N is a natural number find the lowest value of N such that the square root will become a positive integer:

a) $2^3 5^1 7^2 N$

b) $4^2 7^2 5^2 N$

c) $3^4 5^3 12 N$

d) $38412 \times N$

e) $13992 \times N$

f) $664 \times (N - 1)$

6. Given that N is an integer greater than one and $N \neq 0$, what is the lowest value of N so that “ K ” is a perfect square (Given $K \neq 0$)

a) $K = N \times 3^3 \times 21$

d) $K = (N - 1) \times 7^7 \times 121$

b) $K = N \times 3^3 \times 5^5$

e) $K = N^2 + N$

c) $K = N \times 75 \times 169$

f) Challenge: $K = (3N - 24)(N - 28)$

7. By looking at the prime factorization of a number, how can you determine whether if it is a perfect square or not? Explain:

8. Explain how you would multiply the following using the prime factorization. Do Not use a calculator:
 $15 \times 25 \times 35 \times 45 \times 16$

9. A building has 18 storeys above ground and 5 storeys below ground. If each storey is 5 meters high, then how tall is the building?

10. In a magic square, the numbers in each row, column, and diagonal have the same sum. This is called the magic sum. What is the magic sum for this magic square?

2	3	-2
-3	1	5
4	-1	0

b) Multiply each integer in the square by -2. Is the result another magic square? If so, what is the new magic sum?

c) Create a magic square with a magic sum of -12.

11. Find the value of "N" in each equation:

a) $18,000 = N \times 2^3 \times 5^3 \times 6$

b) $80,640 = N \times 2^5 \times 12 \times 14$

12. Let a, b, c, d, and e be distinct integers such that: $(6-a)(6-b)(6-c)(6-d)(6-e) = 45$. What is the value of $a+b+c+d+e$?