

Name: _____

Date: _____

Math 8 Honours Assignment 1.4 Prime Factorization and Factors Part 2:

1. Find the lowest value of N such that the square root will become a positive integer:

a) $\sqrt{2^3 5^1 7^2 N}$

b) $\sqrt{4^2 7^2 5^2 N}$

c) $\sqrt{3^4 5^3 12N}$

d) $\sqrt{38412N}$

e) $\sqrt{13992N}$

f) $\sqrt{664(N-1)}$

2. Find the lowest value of N such that the cube root will become a positive integer:

a. $\sqrt[3]{2^3 5^1 7^2 N}$

b. $\sqrt[3]{4^2 7^2 5^2 N}$

c. $\sqrt[3]{3^4 5^3 12N}$

3. Indicate the number of factors for each of the following numbers:

a) $N = 2^3 3^5$

b) $N = 2^3 3^4 (25)$

c) $N = 3888$

4. Find the lowest value of N such that the integer will have the indicated the indicated number of factors:

a) $2^3 3^N$ (8 factors)

b) $(8) \times 27N$ (48 factors)

c) $2^3 3^4 N^2$ (56 factors)

5. Find the sum of all the factors for each of the following:

a) 144

b) 7920

c) $2^3 \times 3^2 \times 5^3$

6. What is the largest prime factor of 3045?

7. Find n , such that $2^3 3^2 n = 10!$

8. How many factors of 4000 are perfect squares?

9. How many factors of 21,600 are perfect squares?

10. What is the least positive integer that is not a factor of $7!$?

11. How many positive integral factors does N have if $N = 6^2 \times 15$?

12. What is the smallest positive integer by which 80 can be multiplied so that the product will be a perfect cube?

13. What is the smallest number that has 1 to 10 as its factors?

14. What is the smallest positive integer that has the numbers 1 to 20 as its factors?

15. What is the smallest number with 36 factors?

16. What is the sum of three greatest consecutive integers less than 200 for which the least number has 4 as a factor, the next has 5 as a factor, and the largest number has 6 as its factor?
17. What is the smallest positive integer n , for which 88 is a factor of $n!$?
18. Two positive integers have a GCF of $2 \times 3 \times 5$ and a LCM of $2^3 \times 3^4 \times 5 \times 7$. If one of the numbers is 210, find the other number.
19. Find the smallest number N , such that $2^3 3^4 N^2$ has 56 factors.
20. Two numbers are “*relatively prime*” if they do not share any common factors other than 1. How many positive integers less than or equal to 40 are relatively prime to 40?
21. Challenge: Suppose there are 1000 lockers and 1000 people. The first person opens all the lockers; the second person closes every second locker; the third person changes the state of every third locker [ie: if it's open, he closes it or if it's closed, he opens it]. This process continues, where the n th person changes the state of every n th locker. After all 1000 people have gone through, how many lockers are open?