3.1 – 3.2 Challenge Questions:

1. How many factors of 4000 are perfect squares?

$4000 = 2^5 \times 5^3$ Perfect squares : $2^0, 2^2, 2^4$ and $5^0, 5^2$ $3 \times 2 = 6$

2. What is the smallest value of N so that 80N is a perfect cube? N is a whole number.

$80 = 2^4 \times 5$

$2^2 \times 5^2 = 100 = N$

3. Two positive integers have a GCF of 30 and a LCM of 22680. If one of the numbers is 210, what is the other number?

$30 = 2 \times 3 \times 5$ $22680 = 2^3 \times 3^4 \times 5 \times 7$

$210 = 2 \times 3 \times 5 \times 7$ $N = 2^3 \times 3^4 \times 5 = 3240$

4. What is the lowest value of N so that $(8) \times 27N$ would have 48 factors?

$8 = 2^3$

$27 = 3^3$

$4 \times 4 \times \square = 48$ $\square = 3$

N = smallest perfect square that has no factors of 2 or 3

$\therefore N = 25$

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

$2^4 \times 3^2 \times 5 \times 7 \times 11 \times 13 \times 17 \times 19$

~~1~~, ~~2~~, ~~3~~, ~~4~~, ~~5~~, ~~6~~, ~~7~~, ~~8~~, ~~9~~, ~~10~~, ~~11~~, ~~12~~, ~~13~~, ~~14~~, ~~15~~, ~~16~~, ~~17~~, ~~18~~, ~~19~~, ~~20~~

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

$45 = 3^2 \times 5$

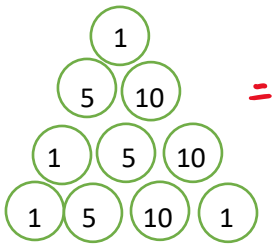
$= (-1)(1)(-3)(3)(5)$

$a = 7$ $c = 9$ $e = 1$

$b = 5$ $d = 3$

$7 + 5 + 9 + 3 + 1 = 25$

7. Mr.H places coins in the order of penny, nickel, dime, penny, nickel, dime and so on, so that each row has one more coin than the previous row as shown. What is the value of all the coins if there are 20 rows?



$1 + 2 + 3 + 4 + \ldots + 20$

$= \frac{20(1+20)}{2} = 210$ coins

every 3 coins = \$0.16

$210 \div 3 = 70$ sets

0.16×70

= \$11.20