Maxima – Minima Assignment 1- Level 1: Greenhorn)

1) $a + b + c = 19$ find maximum value $a \times b \times c$

2) $a + b + c = 7$. Find Maximum value of $a^2 b^3 c^4$

3) If p ,q ,r , s are real numbers such that $p^2+q^2=1$, $r^2+s^2=1$, then maximum value of p r + q s would be

4) If a, b and c are positive variables and a + b + c = 12, find maximum value of $(a + 1) \times (b + 2) \times c$

5) If a + 2b + 3c = 9 find maximum value of a × b × c. (Given a, b and c are positive)

6) If a + 2b + 3c = 63, find maximum value of $a^3 \times b^5 \times c$. (Given a, b and c are positive)

7) Find the maximum value of $(7 - x)^4 * (2 + x)^5$ when x lies between 7 and - 2.

8) If 2a + 5b = 7 ; find the maximum value of $(a+1)^2 \times (b+2)^3$

9) $a + b + 2c = 8$ and $a^2 + b^2 + 2c^2 = 25$. Maximum possible value of c is Q. Find Q

10) Given that x, y, z < 0 and x + y + z = −4. Find maximum value of xy + yz + zx

11) If x and y are positive real numbers such that x + y = 8, what is the minimum value of $7x^2 + 9y^2$

12) If $a^2 + b^2 + c^2 = p^2 + q^2 + r^2 = 101$, where a, b, c, p, q and r are all distinct real numbers, then which of the following inequalities is true?
a) ap + bq + cr < 99 b) ap + bq + cr < 101 c) ap + bq + cr < 202 d) ap + bq + cr < 200

13) 15x + 20y = 375. What is the minimum value of $(x^2+y^2)^{1/2}$

14) Given that the real numbers a ,b ,c ,d and e satisfy simultaneously the relations a +b +c +d +e = 8 and $a^2+b^2+c^2+d^2+e^2 = 16$, find sum of the maximum and minimum value of a

15) If $x^2+y^2 =14x+6y+6$, find sum of maximum and minimum value of 3x+4y

16) If a,b ,c are positive numbers and $a^2+b^3+c^4 = 39$, find the maximum value of $a \times b \times c$

17) Three positive real number a ,b ,c lie between $0< =a ,b ,c<=1$ find maximum value of

$$\frac{a}{1+bc}+\frac{b}{1+ac}+\frac{c}{1+ab}$$

18) Given: x & y are positive real numbers.

(i) x + y = 5. Find the maximum value of x^3y^2

(ii) 2x+3y = 10. Find the maximum value of xy

(iii) xy = 28. Find the minimum value of 4x + 7y.

19) If 5x+2y+z=81 where x ,y and z are positive integer .Then find the absolute difference between the maximum and minimum possible value of (x +y +z)

20) a +b +c=25 , ab +bc +ca =75 . a ,b, c are real numbers Find maximum value of a

Answer Keys

1	**6859/27**
2	$2^2 \times 3^3 \times 4^4 \times (7/9)^9$
3	**1**
4	**125**
5	27/6
6	$21^3 \times (35/2)^5 \times 7/3$
7	$4^4 \times 5^5$
8	$(19/5)^2 \times (57/25)^3$
9	**3.5**
10	**16/3**
11	**252**
12	**ap +bq +cr < 101**
13	**15**
14	**3.2**
15	**66**
16	$2^{(7/6)} \times 3^{(11/6)}$
17	**2**
18	**(i)108 (ii)$\frac{25}{6}$ (iii) 56**
19	**57**
20	**65/3**