D/MAT 100: Basic Mathematics CAT I

1. Solve the simultaneous equations $3^{x+y} = 243, \quad 2^{2x-5y} = 8$

2. If $x = \dfrac{2\sqrt{24}}{\sqrt{2}+\sqrt{3}}$, *find the value of* $\dfrac{x+\sqrt{8}}{x-\sqrt{8}} + \dfrac{x+\sqrt{12}}{x-\sqrt{12}}$

3. Expand the following as far as the term in x^3

   a. $\dfrac{1}{(2+x)^2}$

   b. $\dfrac{\sqrt{1+2x}}{1-x}$

4. Find the first four terms in the expansion of $(1-8x)^{1/2}$ in descending powers of x. Substitute $x = \dfrac{1}{100}$ and obtain the value of $\sqrt{23}$ correct to five significant figures.

5. Find the difference between the sums of the first ten terms of the APs whose first terms are 12 and 8, and whose common differences are respectively 2 and 3.

6. Factorize $y^3 - 6y^2 - y + 30$