James Clements
BioMath Assn 3

1)

$$\frac{d[A]}{dt} = -k_1[A][B]$$
$$\frac{d[B]}{dt} = -k_1[A][B]$$
$$\frac{d[C]}{dt} = k_1[A][B]$$

where k_1 is the reaction rate constant (RRC) of A and and B

2)

$$\frac{d[A]}{dt} = -k_1[A][B] + k_{-1}[C]$$
$$\frac{d[B]}{dt} = -k_1[A][B] + k_{-1}[C]$$
$$\frac{d[C]}{dt} = k_1[A][B] - k_{-1}[C]$$

where k_1 is the RRC of A and B and k_{-1} is the RRC of C into A and B

3)

$$\frac{d[A]}{dt} = -k_1[A][B] + k_{-1}[C]^2$$
$$\frac{d[B]}{dt} = -k_1[A][B] + k_{-1}[C]^2$$
$$\frac{d[C]}{dt} = \sqrt{k_1[A][B] - k_{-1}[C]^2}$$

where k_1 is the RRC of A and B and k_{-1} is the RRC of C into A and B

4)

$$\frac{d[A]}{dt} = \sqrt{-k_1[A]^2[B]^3 + k_{-1}[C][D]}$$
$$\frac{d[B]}{dt} = \sqrt[3]{-k_1[A]^2[B]^3 + k_{-1}[C][D]}$$
$$\frac{d[C]}{dt} = k_1[A]^2[B]^3 - k_{-1}[C][D]$$
$$\frac{d[D]}{dt} = k_1[A]^2[B]^3 - k_{-1}[C][D]$$

where k_1 is the RRC of A and B and k_{-1} is the RRC of C and D into A and B