

### Exp. 1

| $[A]_i$    | $[B]_i$    | initial rate                 |
|------------|------------|------------------------------|
| <u>(M)</u> | <u>(M)</u> | <u>(M s<sup>-1</sup>)</u>    |
| <u>1.0</u> | <u>1.0</u> | <u>1.0 x 10<sup>-3</sup></u> |

$$\text{rate} = k[A]^a[B]^b$$

$$\frac{\text{rate 2}}{\text{rate 1}} = \frac{2 \times 10^{-3}}{1 \times 10^{-3}} = \frac{[2.0]^a}{[1.0]^a} \quad a = 1$$

### Exp. 2

| $[A]_i$    | $[B]_i$    | initial rate                 |
|------------|------------|------------------------------|
| <u>(M)</u> | <u>(M)</u> | <u>(M s<sup>-1</sup>)</u>    |
| <u>2.0</u> | <u>1.0</u> | <u>2.0 x 10<sup>-3</sup></u> |

$$\frac{\text{rate 3}}{\text{rate 1}} = \frac{1 \times 10^{-3}}{1 \times 10^{-3}} = \frac{[2.0]^b}{[1.0]^b} \quad b = 0$$

$$\text{rate} = k[A]$$

### Exp. 3

| $[A]_i$    | $[B]_i$    | initial rate                 |
|------------|------------|------------------------------|
| <u>(M)</u> | <u>(M)</u> | <u>(M s<sup>-1</sup>)</u>    |
| 1.0        | <u>2.0</u> | <u>1.0 x 10<sup>-3</sup></u> |

1st order reaction

$$1 \times 10^{-3} \text{ (M s}^{-1}\text{)} = k [1.0 \text{ M}]$$

$$k = 1 \times 10^{-3} \text{ s}^{-1}$$