

**Kinetics I Quiz**

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Name: Benjamin Lauring

May I post your solution?

Yes

No

Yes, but redact my name

Consider the following rate data for the reaction:



Experiment	[A] <sub>0</sub> (M)	[B] <sub>0</sub> (M)	Initial Rate (M/s)
1	0.100	0.200	0.001762
2	0.100	0.400	0.003524
3	0.400	0.200	0.001762

Determine the value of the rate constant (k) for this reaction, including the units.

$$\text{Rate} = k [A]^0 [B]^1$$
  

$$k = \frac{\text{Rate}}{[B]}$$
  

$$k = \frac{0.001762 \text{ M/s}}{0.200 \text{ M}} = 0.00881 \text{ s}^{-1}$$

B doubles  
 Rate doubles  
  
 A quadruples  
 Rate is constant

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Name: Damen Lin

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Yes

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1	0.100	0.200	0.001762
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Determine the value of the rate constant (k) for this reaction, including the units.

$$\text{Rate} = k [A]^m [B]^n$$
  

$$m = \frac{\log\left(\frac{0.001762}{0.001762}\right)}{\log\left(\frac{0.1}{0.1}\right)} = 0$$
  

$$n = \frac{\log\left(\frac{0.001762}{0.003524}\right)}{\log\left(\frac{0.2}{0.4}\right)} = 1$$

$$0.001762 \frac{\text{M}}{\text{s}} = (0.1 \text{ M})^0 (0.2 \text{ M})^1 k$$
  

$$0.001762 \frac{\text{M}}{\text{s}} = 0.2 \text{ M} (k)$$
  

 $k = 0.00881 \text{ s}^{-1}$

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Name: Brandi Richards

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1	0.100	0.200	0.001762
2	0.100	0.400	0.003524
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Determine the value of the rate constant (k) for this reaction, including the units.

rate = k[A]<sup>0</sup>[B]<sup>1</sup>

0.001762 M/s = k(0.100 M)<sup>0</sup>(0.200 M)<sup>1</sup>

**k = 0.00881 s<sup>-1</sup>**

[A]<sup>a</sup> ⇒  $\left(\frac{0.001762 \text{ M/s}}{0.001762 \text{ M/s}}\right) = \left(\frac{0.400 \text{ M}}{0.100 \text{ M}}\right)^a$   
 $1 = (4)^a \Rightarrow a = 0$

[B]<sup>b</sup> ⇒  $\left(\frac{0.003524 \text{ M/s}}{0.001762 \text{ M/s}}\right) = \left(\frac{0.400 \text{ M}}{0.200 \text{ M}}\right)^b$   
 $2 = (2)^b \Rightarrow b = 1$

$\frac{\text{M}}{\text{s}} \Rightarrow \frac{\text{M}}{\text{s}} \cdot \frac{1}{\text{M}} = \frac{1}{\text{s}}$

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Name: Alex Halberstam

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3	0.400	0.200	0.001762

Determine the value of the rate constant (k) for this reaction, including the units.

$\left(\frac{0.4}{0.2}\right)^n = \frac{0.003524}{0.001762}$

$2^n = 2$

$n = 1$

$\left(\frac{0.4}{0.1}\right)^m = \frac{0.001762}{0.001762}$

$4^m = 1$

$\Rightarrow m = 0$

$R = k[B]^1[A]^0$

$\rightarrow 0.001762 \text{ M/s} = k[0.2 \text{ M}]^1[0.1 \text{ M}]^0$

**k = 0.00881 s<sup>-1</sup>**