

1) A: The specific series of data is not reproducible

Reaction time differs so even when you collect when the significant digits of clock reset back to the original time, there is no assurance you will obtain the same number.

$$2) K \approx \left| \frac{4x}{x} \right| = \left| \frac{f(x) - f(x+4x)}{f(x)} \right|$$

$$= \left| \frac{x}{f(x)} \right| \left| \frac{f(x) - f(x+4x)}{4x} \right| \quad \begin{array}{l} x=2 \\ f(x)=x^3 \end{array}$$

$\approx f'(x)$

$$\approx \left| \frac{x}{f(x)} \right| |f'(x)| = \left| \frac{2}{8} (3(2)^2) \right| = \frac{24}{8} = 3$$

3) 15.625

$$\begin{array}{ccccccc} 1 & 1 & 1 & 1 & . & 1 & 0 & 1 \\ \downarrow & \downarrow & \downarrow & \downarrow & & \downarrow & & \downarrow \\ 8 & 4 & 2 & 1 & & \frac{1}{2} & & \frac{1}{8} \end{array}$$

In floating point form this becomes

$$1.111101 \times 2^3$$

$$4) \begin{bmatrix} ? \\ \cdot \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} = \begin{bmatrix} 4 \\ 2 \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} = \begin{bmatrix} 4 \\ 2 \\ 1 \end{bmatrix}$$

5)

$$-4.1513457 - 4.1514789 = -8.3028248$$

keeps all digits of accuracy

$$4.1513457 - 4.1514789 = -0.0001332$$

←

In the underlying floating point representation

$$1.3320000 \times 10^{-4}$$

Accurate
digits

Garbage digits

So we have four decimal digits of
accuracy.