Name: *Answer Key*   **Date:**   **Period:**

Kinematics Practice

For each problem:
1. Make a drawing
2. List the information given (knowns and unknowns) in a table (s =, d =, etc.)
3. Show the equations you use and display your work
4. Solve or simplify your answer systematically before you plug numbers in
5. Write appropriate units for each answer.
6. Check your work

You may write on this sheet or a separate one.

Given Equations:

Average Speed = $\dfrac{\text{total distance}}{\text{total time}}$ or $s = \dfrac{d}{t}$ Average Velocity = $\dfrac{\text{displacement}}{\text{total time}}$ or $v_{avg} = \dfrac{\Delta x}{t}$

Acceleration = $\dfrac{\text{change in velocity}}{\text{Time}}$ or $a = \dfrac{\Delta v}{t}$

*Remember: displacement/distance → meters (m)

   speed/velocity → meters/second (m/s) or kilometers/hour (km/hr)
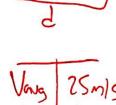
   acceleration → meters/second/second (m/s²)

1. A car in front of Valhalla goes a distance of 30m in 2.35 seconds. What is its speed?

$$\begin{array}{c|c} d & 30m \\ t & 2.35\ sec \\ v & ? \end{array}$$

$$V = \dfrac{d}{t} = \dfrac{30m}{2.35\ sec} = \boxed{12.77\ m/sec}$$

2. What is your average speed if you go a distance of 280 km in 3.0 hours?

$$\begin{array}{c|c} V & ? \\ d & 280\ km \\ t & 3\ hrs \end{array}$$

$$V = \dfrac{d}{t} = \dfrac{280\ km}{3\ hrs} = \boxed{93.\overline{33}\ km/hr}$$

3. A motorcycle speeds up from 0 m/s to 27 m/s in 3.0 seconds. What is its acceleration?

$$\begin{array}{c|c} V_i & 0\ m/s \\ V_F & 27\ m/s \\ t & 3\ sec \end{array}$$

$$a = \dfrac{\Delta V}{t} = \dfrac{(V_F - V_i)}{t} = \dfrac{27\ m/s}{3\ sec} = \boxed{9\ m/s^2}$$

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4. A jet ski has an average velocity of 25 m/s. If the jet ski traveled for 6.0 seconds, what was its displacement?

V_{avg}

d

$$t \cdot V = \frac{d}{t} \cdot t \rightarrow d = V \cdot t = 25 \, m/s \cdot 6 \, sec = \boxed{150 \, m}$$

V_{avg}	25 m/s
t	6 sec
d	?

5. A shark travels with an average velocity of 12 m/s. How long (time) would it take the shark to swim 42 m at that velocity?

V_{avg}

t

d

V_{avg}	12 m/s
t	?
d	42 m

$$t \cdot V = \frac{d}{t} \cdot t \rightarrow \frac{d}{V} = \frac{t \cdot V}{V} = t = \frac{d}{V} = \frac{42 \, m}{12 \, m/s}$$

$$\boxed{\rightarrow = 3.5 \, sec}$$

6. A moped has an acceleration of 5 m/s². If the moped travels for 4.0 seconds, what is the moped's change in velocity?

a

t

ΔV

a	5 m/s²
t	4 sec
ΔV	?

$$t \cdot a = \frac{\Delta V}{t} \cdot t = \Delta V = a \, t = (5 \, m/s^2)(4 \, sec) = \boxed{20 \, m/s}$$

7. A helicopter has change of velocity of 30 m/s in 60 seconds. What is the helicopter's acceleration? (It's not 2!)

ΔV

t

a

ΔV	30 m/s
t	60 sec
a	?

$$a = \frac{\Delta V}{t} = \frac{30 \, m/s}{60 \, sec} = \boxed{.5 \, m/s^2}$$

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