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**Motion in 1D - Example Problems**

EX1: A plane starts from rest and accelerates at 3.3 m/s2.

* Read the problem carefully
* Identify and list all "givens" (watch for inferred information)
* Draw a simplified diagram (include at least vi, Δx, a)

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| Givens:  a = 3.3 m/s2  vi = 0 m/s2  xi = 0 m | Diagram  Xi = 0m  Vi = 0m/s2  a = 3.3 m/s2 |

For each problem (a-d) below, write the full equation with variables before any substitution. Show clear work.

1. How much distance has the plane traveled after 8 s?

Meters traveled

1. What is the speed of the plane after 8 s?
2. How many seconds does it take the plane to reach 50 m/s?
3. What is the minimum length of runway required if the plane must be traveling at 70 m/s to lift off?

EX2: A stone is dropped off the top of a 100 m high building. (Note: The acceleration of gravity is -9.8 m/s2)

* Read the problem carefully
* Identify and list all "givens" (watch for inferred information)
* Draw a simplified diagram (include at least vi, Δx, a)

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| Givens:  vi = 0  a = -9.8 m/s2  xi = 100m | Diagram  a = -9.8 m/s2  Xi = 100m  Vi = 0m/s2 |

For each problem, show the official equation before any substitution. Show clear work. Redraw diagrams as needed.

1. How many seconds elapse until the stone is 60 m above the ground?
2. How many seconds elapse until the stone has fallen 75 m?
3. What is the velocity of the stone the instant before it hits the ground?
4. At what height above the ground is the stone traveling at -35 m/s?