

Identifying Motion Variables

Name: _____

Variable	Name	Description	Units
d	Displacement	How far the object travelled.	m
t	Time	How long the object took to travel.	s
v_i	Initial Velocity	The object's velocity at the start.	m/s
v_f	Final Velocity	The object's velocity at the end.	m/s
a	Acceleration	The object's rate of velocity gain.	m/s^2

In each of the situations below, identify the variables you are being given and what you are being asked for.

d	t	v_i	v_f	a
	5 s	0	20 m/s	?

1. A car starting from rest, gets up to 20 m/s in 5 seconds. What was its acceleration?

d	t	v_i	v_f	a

2. A jogger covers 20 m in 5 seconds, with an acceleration of 2 m/s^2 . What was her initial velocity?

d	t	v_i	v_f	a

3. What is the final velocity of a horse that starts at 4 m/s and accelerates at 1 m/s^2 for 3 seconds?

d	t	v_i	v_f	a

4. A sprinter, starting from rest, accelerates at 2 m/s^2 for 3 seconds. How far did he go?

d	t	v_i	v_f	a

5. How long would it take a car to go from 10 m/s to 30 m/s, if it accelerated at 3 m/s^2 ?

These are two equations of motion. In each of the problems below:

$$d = v_i t + (0.5)at^2$$

$$v_f = v_i + at$$

- 1) Identify the variables.
- 2) Pick out the equation that would work.
- 3) Plug in the numbers, BUT DO NOT SOLVE.

d	t	v_i	v_f	a
	5 s	0	20 m/s	?

1. A car starting from rest, gets up to 20 m/s in 5 seconds. What was its acceleration?

2nd equation:
 $20 = 0 + a(5)$

d	t	v_i	v_f	a

2. What is the final velocity of a jogger that starts at 1 m/s and accelerates at 2 m/s^2 for 4 seconds?

d	t	v_i	v_f	a

3. A car, starting from rest, accelerates at 4 m/s^2 for 10 seconds. How far did it go?

d	t	v_i	v_f	a

4. A sprinter covers 40 m in 5 seconds, with an acceleration of 2 m/s^2 . What was her initial velocity?

d	t	v_i	v_f	a

5. How long would it take a rocket to go from 100 m/s to 200 m/s, if it accelerated at 5 m/s^2 ?