Stopping distance

Car-drivers and cyclists rely on friction to stop.

When a driver has to brake, it takes time for him to react. In that fraction of a second, the car can travel many meters.
This is called the **thinking distance**.
A driver's reaction time is usually about 0.7 s.

*Example: a car is travelling at 20 m/s (45 mph). The driver has a reaction time of 0.7 s. How far does he travel **before** he starts to brake?*

- The **braking distance** is the distance travelled by the car from the point where the brakes are applied to where it comes to rest.

Which factors affect the **thinking distance** and the **braking distance**?
To answer this question, read the following list, and place each item in the right place

- *use of alcohol*
- *wet road*
- *use of drugs*
- *driver is tired*
- *driver is using a cell phone*
- *worn tyres*
- *high speed*
- *worn brakes*
- *heavy car*

The **thinking distance** depends on:

The **braking distance** depends on:

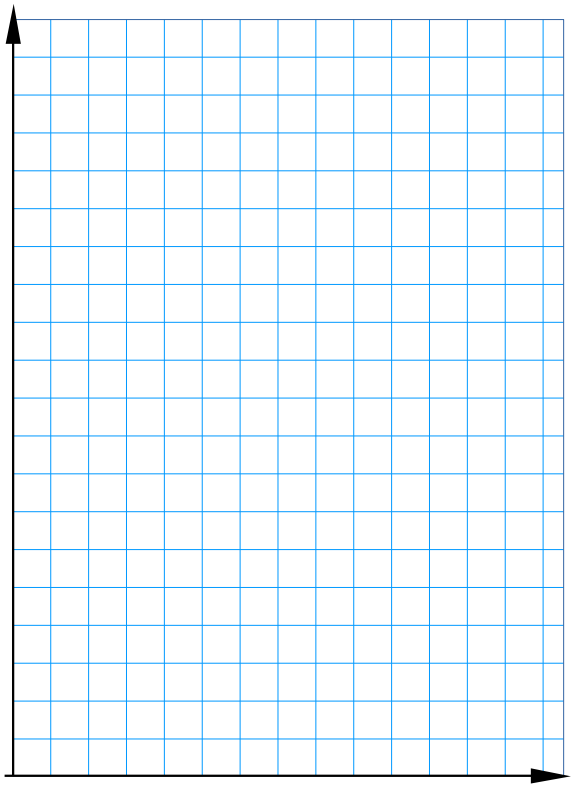
- The **stopping distance** is the thinking distance added to the braking distance.

Fill in the following table: *(use a spreadsheet on a computer)*

speed (m/s)	thinking d (m)	braking d (m)	stopping d (m)
4,5		**1,5**	
9		**6**	
13,5		**13,5**	
18		**24**	
22,5		**37,5**	
27		**54**	

Plot a graph of:

- the thinking distance against the speed of the vehicle.
- the braking distance against the speed of the vehicle.



Estimate the stopping distance for a car driving at 20 m/s.

How does the **thinking distance** vary with speed?

How does the **braking distance** vary with speed?