

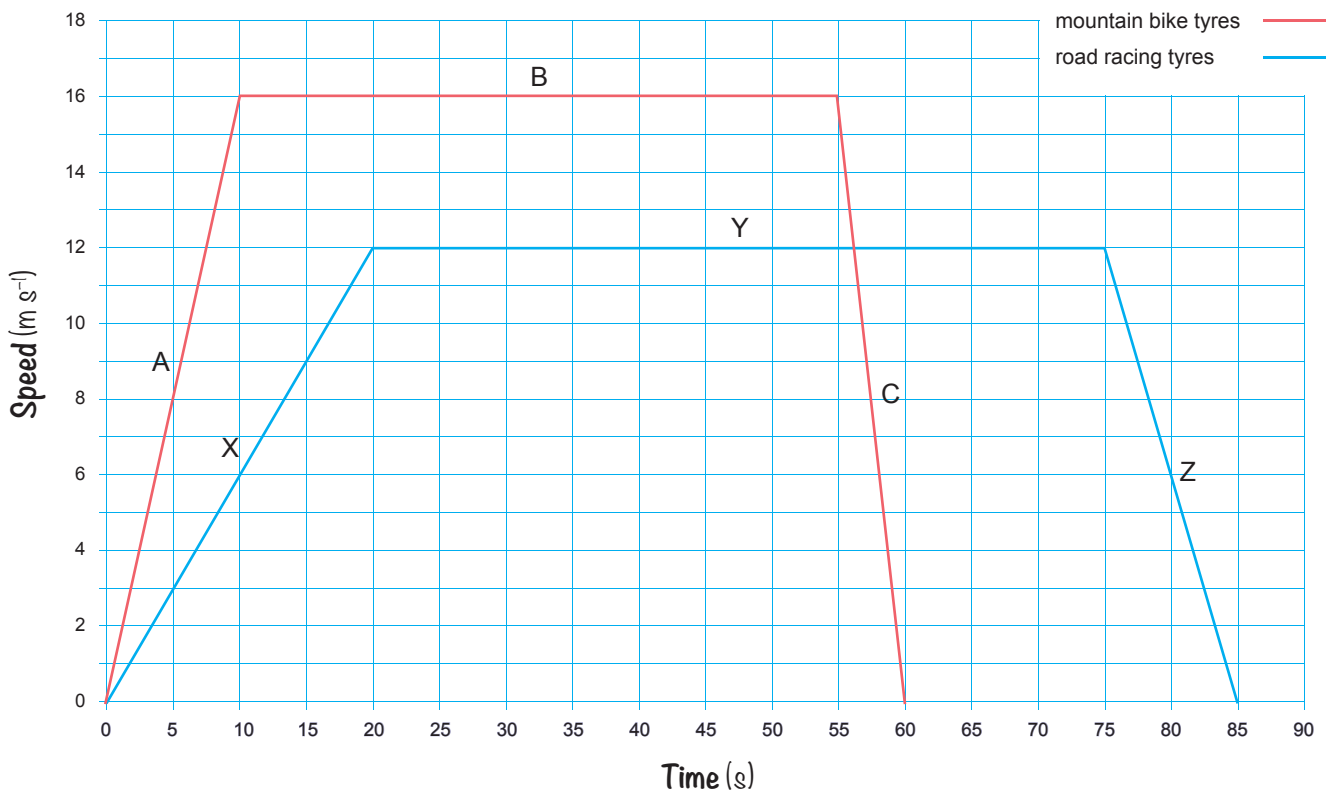
# Thinking Question

The pictures opposite show two different types of tyres. One is from a mountain bike and the other is from a road racing bike.

John and Tim have identical bikes except that John's bike has mountain bike tyres while Tim's bike has road racing tyres. They decide to test the performance of the two types of tyres by measuring the progress of the bikes around an 840 m muddy grass track they have marked out. John attaches his phone to each of the bikes in turn because it has an app which will record speed and time. To make it a fair test Tim does the riding of both bikes. From the phone app they obtain the speed time graph shown below.



Speed-Time Graph Showing an 840 m Bike Ride Using Two Different Types of Tyres



Section **A** = 0 to 10 Seconds  
 Section **X** = 0 to 20 Seconds

Section **B** = 10 to 55 Seconds  
 Section **Y** = 20 to 75 Seconds

Section **C** = 55 to 60 Seconds  
 Section **Z** = 75 to 85 Seconds

- On the picture opposite of an **accelerating** cyclist, **sketch labelled arrows** to show the direction and relative size of the **four** forces acting on rider plus bike.



