Guide to: Velocity time graphs

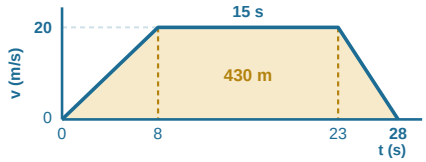
maths Links

Explanation:

On a velocity-time graph, the **gradient represents acceleration** (change in velocity ÷ time) and the **area under the graph represents distance travelled**. For straight-line graphs, split the region into triangles and trapeziums; for curved graphs, draw a tangent at the given point to estimate instantaneous acceleration.

To estimate the distance under a curve using strips of equal width, split the area into a triangle and trapeziums: if the curve is concave down, the chords lie below the curve so your answer is an **underestimate**; if concave up, it is an **overestimate**.

Example 1: A car accelerates uniformly from rest to 20 m/s in 8 s, travels at 20 m/s for 15 s, then decelerates to rest in 5 s. Find the deceleration and total distance.



Solution:

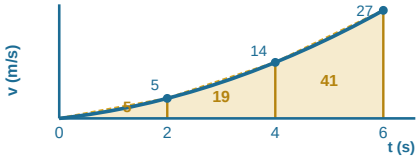
Deceleration = $\frac{20}{5}$ = **4 m/s^2** (gradient = −4 m/s^2)

Total time = 8 + 15 + 5 = 28 s (top side = 15 s)

Area of trapezium = $\frac{15 + 28}{2}$ × 20 = 430 m

Answer: 4 m/s^2 and 430 m

Example 2: Velocity v (m/s) at t = 0, 2, 4, 6 s is 0, 5, 14, 27. Estimate the distance travelled in 6 s using 3 strips of equal width.



Solution:

Strip 1 (0 to 2): $\frac{1}{2}$ × 2 × 5 = **5 m**

Strip 2 (2 to 4): $\frac{5 + 14}{2}$ × 2 = **19 m**

Strip 3 (4 to 6): $\frac{14 + 27}{2}$ × 2 = **41 m**

Answer: 5 + 19 + 41 = 65 m

Worksheets and other links					
Video Lesson on this topic	Video		**Naiker Maths**	Qs	Ans
Ken Stafford (Past Paper Qs)	Qs	Ans	**Dr Austin Maths**	Qs	Ans
Maths Genie	Qs	Ans	**Maths Made Easy**	Qs	Ans
Corbettmaths (Practice)	Qs	Ans	**Metatutor**	Qs	Ans
Corbettmaths (Textbook)	Qs	Ans	**E Classroom**	Qs	Ans
1st Class Maths	Qs	Ans	**PMT (Edexcel)**	Qs	Ans

Questions by topic | **Past Papers** | **Maths worksheets**

Buy workbook | **Quizzes** | **More resources like this**

ken@mathslinks.co.uk