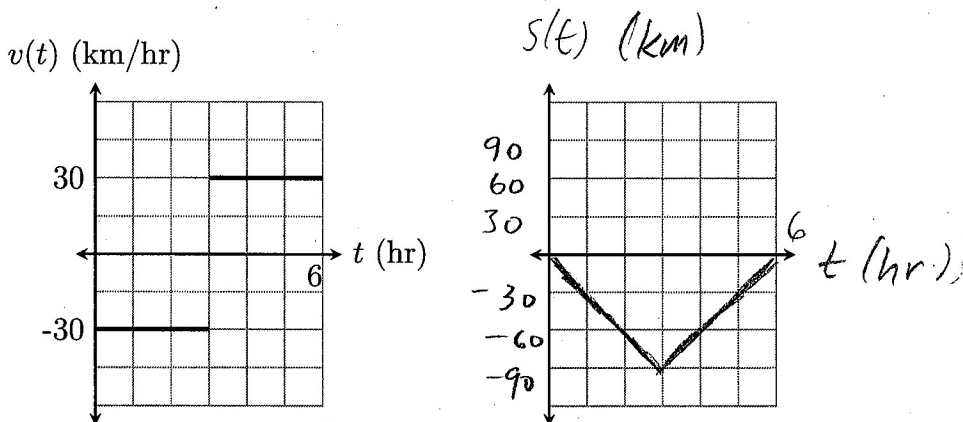


1. Below on the left is a velocity graph for a journey.

+2 (a) In a sentence or two, describe this journey.

+5 (b) On the blank graph, draw the corresponding displacement curve. Label all axes and important points accurately.

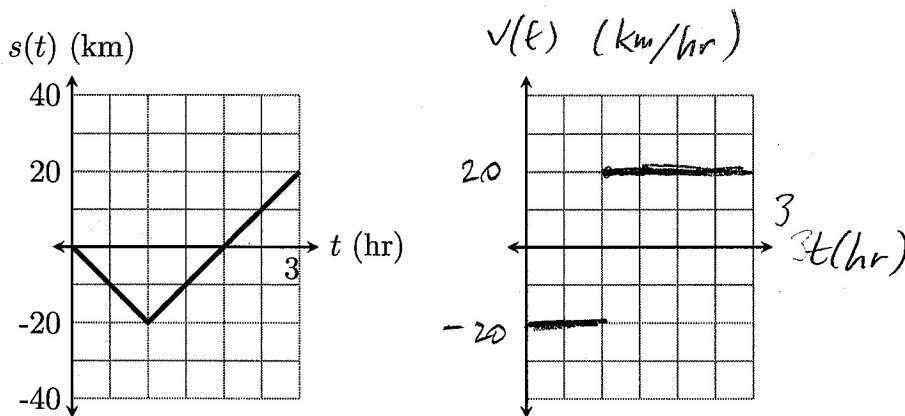


Description: You drive west at 30 km/hr for 3 hours, then you turn around and drive east at 30 km/hr for 3 hours.

2. Below on the left is a displacement graph for a journey.

+2 (a) On the blank graph, draw the corresponding velocity curve. Label all axes and important points accurately.

+5 (b) In a sentence or two, describe this journey.



Description: You drive west at 20 km/hr for 1 hour, then you turn around and drive east at 20 km/hr for 2 hours.

+10 3. Using the definition of the derivative, if $f(x) = 2x^2 + 1$, find $f'(x)$.

$$\begin{aligned}
 f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \\
 &= \lim_{h \rightarrow 0} \frac{2(x+h)^2 + 1 - (2x^2 + 1)}{h} \\
 &= \lim_{h \rightarrow 0} \frac{2(x^2 + 2xh + h^2) + 1 - 2x^2 - 1}{h} \\
 &= \lim_{h \rightarrow 0} \frac{2x^2 + 4xh + 2h^2 - 2x^2}{h} \\
 &= \lim_{h \rightarrow 0} \frac{4xh + 2h^2}{h} \\
 &= \lim_{h \rightarrow 0} (4x + 2h) = 4x
 \end{aligned}$$

+2 4. Suppose you are given a velocity curve. How do you find the corresponding displacement curve? One sentence is enough.

Displacement is the area under the velocity curve.

+3 5. Factor $x^{1/2}$ out of the expression $x^3 - x^{5/2}$. $= x^{\frac{6}{2}} - x^{\frac{5}{2}}$

$$\begin{aligned}
 x^{\frac{6}{2}} - x^{\frac{5}{2}} &= x^{\frac{1}{2}} \left(x^{\frac{5}{2}} - x^{\frac{4}{2}} \right) \\
 &= x^{\frac{1}{2}} \left(x^{\frac{5}{2}} - x^2 \right)
 \end{aligned}$$