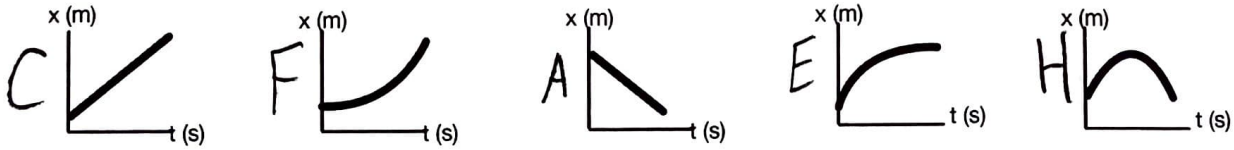
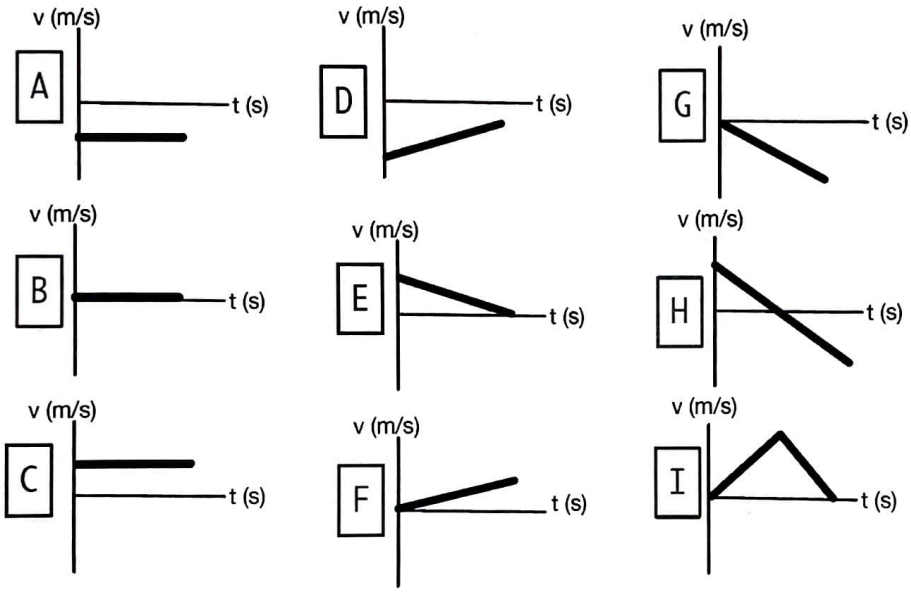
Deeper Understanding (Cycles 8-10) Review

Name: Anne Sirs

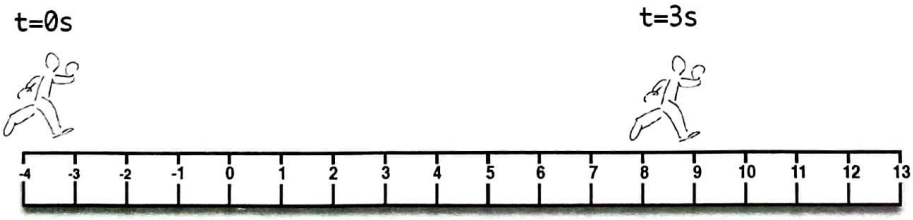
Try as many as you like. For a full DU: Two fully correct or fixable

Match the Position Graphs to one of the Velocity Graphs





Track the FRONT of the person's foot. Fill in the rest of the motion



t (s)	x (m)
0	-3
1	-2
2	2
3	9

v (m/s)
1
4
7

Their acceleration is 3 m/s/s.

Alice's Car

Starting speed = 0 m/s
Acceleration = 2 m/s/s
Top speed = 16 m/s

Bob's Car

Starting speed = 3 m/s
Acceleration = 1 m/s/s
Top speed = 9 m/s

Part 1:

Alice:

$v_i = 0$ m/s
$v_f = 16$ m/s
$a = 2$ m/s/s
$t = ?$

$v_f = v_i + at$
$16 = 0 + (2)t$

$t = 8$ seconds

Bob:

$v_i = 3$ m/s
$v_f = 9$ m/s
$a = 1$ m/s/s
$t = ?$

$v_f = v_i + at$
$9 = 3 + (1)t$

$t = 6$ seconds

Part 2:

When Alice's car reaches top speed, it takes 8 seconds.

Bob's first 6 seconds:

$V_i = 3$ m/s

$V_f = 9$ m/s

$a = 1$ m/s/s

$d = ?$

$V_f^2 = V_i^2 + 2ad$

$9^2 = 3^2 + 2(1)d \Rightarrow 81 = 9 + 2d$ $d = 36$ m

Then, the other 2 seconds

$V_i = 9$ m/s

$a = 0$ m/s/s

$t = 2$ seconds

$d = ?$

$d = V_i t + \frac{1}{2}at^2$

$d = (9)(2) + \frac{1}{2}(0)(2^2)$ $d = 18$ m

$36\text{m} + 18\text{m} =$ **54 meters**

Part 3:

After 8 seconds Bob's car travels 54 meters

Alices car:

$v_i = 0$ m/s

$v_f = 16$ m/s

$a = 2$ m/s/s

$d = ?$

$v_f^2 = v_i^2 + 2ad$

$256 = 0 + 2(2)d$

$256 = 4d$

$d = 64$ m

So... it's less than 8 seconds!

After 6 seconds, bob's car traveled 36 meters.

Alice's car

$v_i = 0$ m/s

$a = 2$ m/s/s

$t = 6$ s

$d = ?$

$d = v_i t + \frac{1}{2}at^2$

$d = 0 + \frac{1}{2}(2)(6^2)$

$d = 36$ meters

After 6 seconds Alice's car passed Bob's!!

Part 4:

Alice's car passes Bob's car in 6 seconds

$V_i = 0$ m/s
$a = 2$ m/s/s
$t = 6$ seconds
$V_f = ?$

$V_f = V_i + at$
$V_f = 0 + (2)(6)$

$V_f = 12$ m/s

Alice's car is moving at 12 m/s when it passes Bob's!