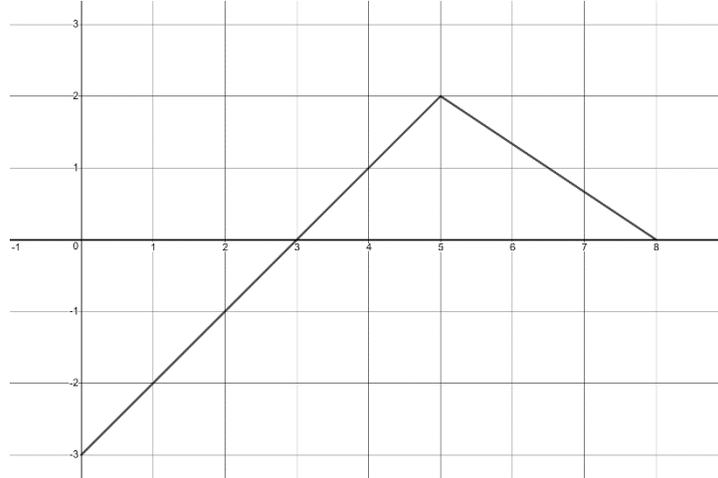Two particles move along the x-axis. For $0 \le t \le 8$, the velocity of particle B at time t is given by $v_B(t) = 3t^2 - 12t + 9$. Particle B is at position $x = -3$ at $t = 1$.

The velocity of the second particle, C, is given by the graph below. Particle C is at position $x = 4$ at $t = 3$.

Answer the following questions about particle B.

1. When is particle B moving to the left?
2. When does particle B have a positive acceleration?
3. When is particle B slowing down?
4. Find the position of particle B at $t = 0$.
5. Find the position of particle B at $t = 8$.
6. Find the position of particle B the first time it changes directions.
7. When is particle B furthest to the left?
8. Use your calculator to evaluate $\int_0^8 v_B(t)\,dt$ and $\int_0^8 |v_B(t)|\,dt$. Interpret the meaning of each integral.

Answer the following questions about particle C.

9. When is particle C moving to the left?
10. When does particle C have a positive acceleration?
11. When is particle C slowing down?
12. Write a function involving an integral that gives particle C's position at any given time.
13. Find the position of particle C at $t = 0$.
14. Find the position of particle C at $t = 8$.
15. Find the position of particle C the first time it changes directions.
16. When is particle B furthest to the left? Right?
17. What is the total distance travelled of particle C between $t = 0$ and $t = 8$.

Answer the following questions about both particles.

18. When are both particles moving in the same direction?
19. At $t = 0$, which particle is further left?
20. At $t = 8$, which particle is further left?