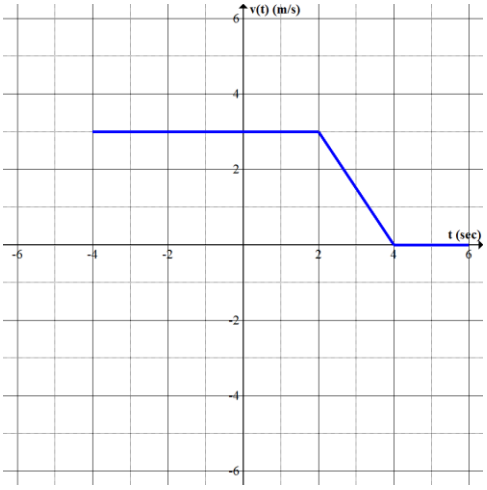
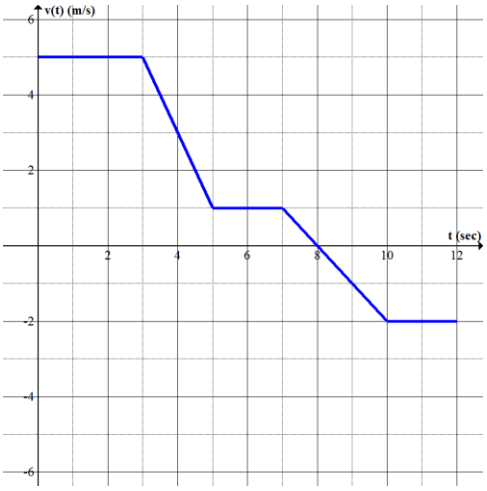
Name: _____ Date: _____ Period: _____ 2016

AP Calculus – Displacement, Distance, Position from Velocity: Velocity, Speed from Acceleration

Given the velocity by time graphs below, find the following.

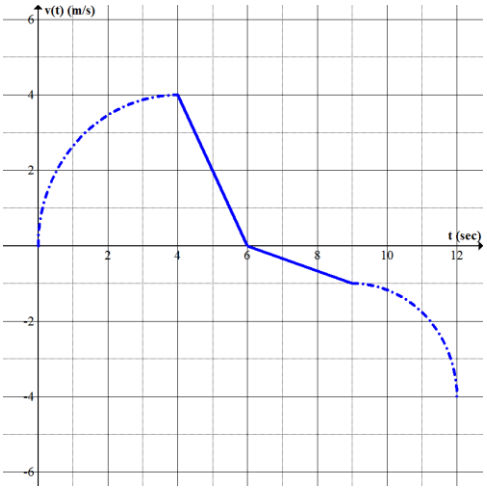


1. How far did the object travel from 0 to 2 seconds?
2. How far did the object travel from 0 to 6 seconds?
3. How far did the object travel from -4 to 0 seconds?
4. If the object had an initial position of 2m at -2 seconds, where is the object at 5 seconds?
5. If the object had an initial position of 3m at -1 second, what is the average velocity of the object at over the next 5 seconds?



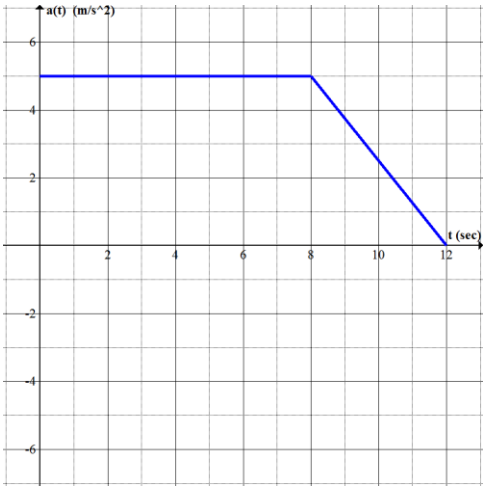
6. How far did the object travel from 0 to 2 seconds?
7. How far did the object travel from 0 to 6 seconds?
8. How far did the object travel from 4 to 0 seconds?
9. If the object had an initial position of 2m at 3 seconds, where is the object at 6 seconds?
10. If the object had an initial position of 5m to the left at 0 seconds, where is the object at 12 seconds?
11. What is the average **speed** of the object for 0 to 12 seconds?

The two dashed curves are quarter-circles.



12. How far did the object travel from 0 to 4 seconds?
13. How far did the object travel from 0 to 6 seconds?
14. How far did the object travel from 0 to 9 seconds?
15. How far did the object travel from 0 to 12 seconds?
16. If the object had an initial position of 2m at 4 seconds, where is the object at 12 seconds?
17. If the object had an initial position of 0m at 0 seconds, where is the object at 12 seconds?
18. If a new graph $h(t)$ is defined by $h(t)=v(t)+3$, where is the object at 12 seconds, if it had an initial position of 0m at 0 seconds?

Given the acceleration by time graphs below, find the following.



I would accurately sketch v(t) to solve ⟶

19. What is the objects' acceleration at 5 seconds?
20. What is the objects' velocity at 5 seconds if it had an initial velocity of 3 m/s?
21. Is the objects' speed increasing or decreasing at 5 seoncds?
22. What is the objects' acceleration at 12 seconds?
23. What is the objects' velocity at 12 seconds if it had an initial velocity of -5 m/s?
24. Is the objects' speed increasing or decreasing at 12 seconds?
25. What is the position of the object at 12 seconds if its initial position and velocity were 5m and -10m/s respectively?

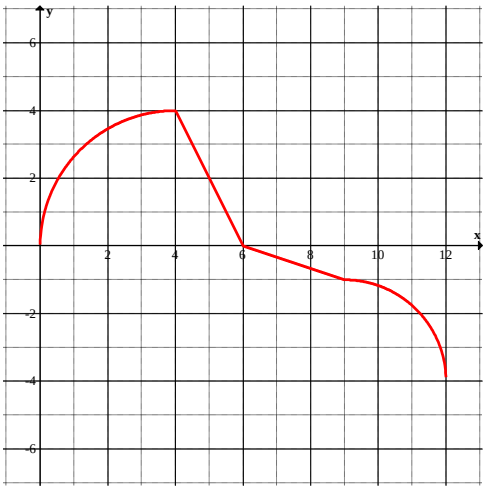
Solve the following indefinite integrals for the general solution and the particular solution from the given initial value.

26. $\frac{dy}{dx} = 3x^3 - \sin x \ , \ y(0) = 10$

27. $\frac{dy}{dx} = xy + y \ , \ y(4) = -e^3$

28. $v(t) = 5t - 4t^{-1} + 6t^2 \ , \ x(1) = 6$

29. $a(t) = \sqrt{t} + 3\sin t - e^t \ , \ v(0) = 4 \ , \ x(0) = 8$


y
x
6
4
2
-2
-4
-6
2
4
6
8
10
12