

## Calculus Practice: Rectilinear Motion 1a

A particle moves along a coordinate line. Its velocity function is  $v(t)$  for  $t \geq 0$ . For each problem, find the position function  $s(t)$ .

1)  $v(t) = -2t + 13$ ;  $s(0) = 0$

A)  $s(t) = -t^2 + 13t$

B)  $s(t) = 2t^2 - 10t - 132$

C)  $s(t) = 2t^2 - 4t - 126$

D)  $s(t) = 4t^2 - 104t + 660$

2)  $v(t) = -3t^2 + 26t - 40$ ;  $s(0) = 0$

A)  $s(t) = t^3 - 13t^2 + 40t$

B)  $s(t) = t^3 - 30t^2 + 225t$

C)  $s(t) = t^3 - 11t^2$

D)  $s(t) = -t^3 + 13t^2 - 40t$

3)  $v(t) = -3t^2 + 30t$ ;  $s(0) = 0$

A)  $s(t) = t^3 - 11t^2 + 24t$

B)  $s(t) = -t^3 + 23t^2 - 120t$

C)  $s(t) = t^3 - 15t^2$

D)  $s(t) = -t^3 + 15t^2$

4)  $v(t) = 4t^3 - 27t^2$ ;  $s(0) = 0$

A)  $s(t) = -t^4 + 13t^3$

B)  $s(t) = t^4 - 14t^3$

C)  $s(t) = t^4 - 9t^3$

D)  $s(t) = t^4 - 15t^3$

5)  $v(t) = -2t + 21$ ;  $s(0) = -98$

A)  $s(t) = -3t^2 + 36t + 84$

B)  $s(t) = 2t^2 - 36t + 90$

C)  $s(t) = -t^2 + 21t - 98$

D)  $s(t) = -4t^2 + 68t - 288$

6)  $v(t) = 4t^3 - 42t^2$ ;  $s(0) = 0$

A)  $s(t) = t^4 - 14t^3$

B)  $s(t) = t^4 - 11t^3$

C)  $s(t) = t^4 - 13t^3$

D)  $s(t) = t^4 - 10t^3$

7)  $v(t) = -3t^2 + 56t - 196$ ;  $s(0) = 0$

A)  $s(t) = -t^3 + 26t^2 - 169t$

B)  $s(t) = -t^3 + 28t^2 - 196t$

C)  $s(t) = -t^3 + 11t^2$

D)  $s(t) = -t^3 + 23t^2 - 120t$

8)  $v(t) = -4t^3 + 27t^2$ ;  $s(0) = 0$

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B)  $s(t) = t^4 - 13t^3$

C)  $s(t) = -t^4 + 10t^3$

D)  $s(t) = t^4 - 8t^3$

9)  $v(t) = -3t^2 + 16t$ ;  $s(0) = 0$

A)  $s(t) = -t^3 + 9t^2$

B)  $s(t) = t^3 - 10t^2$

C)  $s(t) = -t^3 + 22t^2 - 121t$

D)  $s(t) = -t^3 + 8t^2$

10)  $v(t) = 4t^3 - 36t^2$ ;  $s(0) = 0$

A)  $s(t) = -t^4 + 9t^3$

B)  $s(t) = -t^4 + 13t^3$

C)  $s(t) = t^4 - 12t^3$

D)  $s(t) = t^4 - 13t^3$

A particle moves along a coordinate line. Its acceleration function is  $a(t)$  for  $t \geq 0$ . For each problem, find the position function  $s(t)$  and the velocity function  $v(t)$ .

11)  $a(t) = 12t^2 - 84t$ ;  $s(0) = 0$ ;  $v(0) = 0$

- A)  $s(t) = t^4 - 10t^3$ ,  $v(t) = 4t^3 - 30t^2$
- B)  $s(t) = t^4 - 8t^3$ ,  $v(t) = 4t^3 - 24t^2$
- C)  $s(t) = t^4 - 14t^3$ ,  $v(t) = 4t^3 - 42t^2$
- D)  $s(t) = -t^4 + 15t^3$ ,  $v(t) = -4t^3 + 45t^2$

12)  $a(t) = -2$ ;  $s(0) = 60$ ;  $v(0) = 7$

- A)  $s(t) = -t^2 + 10t + 75$ ,  $v(t) = -2t + 10$
- B)  $s(t) = t^2 - 14t$ ,  $v(t) = 2t - 14$
- C)  $s(t) = t^2 - 4t - 45$ ,  $v(t) = 2t - 4$
- D)  $s(t) = -t^2 + 7t + 60$ ,  $v(t) = -2t + 7$

13)  $a(t) = 2$ ;  $s(0) = -112$ ;  $v(0) = -6$

- A)  $s(t) = t^2 - 6t - 55$ ,  $v(t) = 2t - 6$
- B)  $s(t) = -t^2 + 19t - 84$ ,  $v(t) = -2t + 19$
- C)  $s(t) = t^2 - 6t - 112$ ,  $v(t) = 2t - 6$
- D)  $s(t) = t^2 - 16t + 55$ ,  $v(t) = 2t - 16$

14)  $a(t) = -12t^2 + 78t$ ;  $s(0) = 0$ ;  $v(0) = 0$

- A)  $s(t) = -t^4 + 13t^3$ ,  $v(t) = -4t^3 + 39t^2$
- B)  $s(t) = t^4 - 9t^3$ ,  $v(t) = 4t^3 - 27t^2$
- C)  $s(t) = -t^4 + 9t^3$ ,  $v(t) = -4t^3 + 27t^2$
- D)  $s(t) = -t^4 + 14t^3$ ,  $v(t) = -4t^3 + 42t^2$

15)  $a(t) = -2$ ;  $s(0) = -154$ ;  $v(0) = 25$

- A)  $s(t) = -t^2 + 25t - 154$ ,  $v(t) = -2t + 25$
- B)  $s(t) = t^2 - 22t + 117$ ,  $v(t) = 2t - 22$
- C)  $s(t) = -t^2 + 13t - 22$ ,  $v(t) = -2t + 13$
- D)  $s(t) = -t^2 + 22t - 121$ ,  $v(t) = -2t + 22$

16)  $a(t) = -2$ ;  $s(0) = 78$ ;  $v(0) = 7$

- A)  $s(t) = t^2 - 11t - 26$ ,  $v(t) = 2t - 11$
- B)  $s(t) = -t^2 + 22t - 117$ ,  $v(t) = -2t + 22$
- C)  $s(t) = -t^2 + 13t + 14$ ,  $v(t) = -2t + 13$
- D)  $s(t) = -t^2 + 7t + 78$ ,  $v(t) = -2t + 7$

17)  $a(t) = 12t^2 - 60t$ ;  $s(0) = 0$ ;  $v(0) = 0$

- A)  $s(t) = t^4 - 11t^3$ ,  $v(t) = 4t^3 - 33t^2$
- B)  $s(t) = -t^4 + 14t^3$ ,  $v(t) = -4t^3 + 42t^2$
- C)  $s(t) = t^4 - 10t^3$ ,  $v(t) = 4t^3 - 30t^2$
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- D)  $s(t) = t^4 - 12t^3$ ,  $v(t) = 4t^3 - 36t^2$

19)  $a(t) = -2$ ;  $s(0) = -11$ ;  $v(0) = 12$

- A)  $s(t) = -t^2 + 12t - 11$ ,  $v(t) = -2t + 12$
- B)  $s(t) = t^2 - 28t + 196$ ,  $v(t) = 2t - 28$
- C)  $s(t) = t^2 - 8t - 20$ ,  $v(t) = 2t - 8$
- D)  $s(t) = t^2 - 13t - 30$ ,  $v(t) = 2t - 13$

20)  $a(t) = -12t^2 + 54t$ ;  $s(0) = 0$ ;  $v(0) = 0$

- A)  $s(t) = -t^4 + 11t^3$ ,  $v(t) = -4t^3 + 33t^2$
- B)  $s(t) = -t^4 + 9t^3$ ,  $v(t) = -4t^3 + 27t^2$
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