

Motion Along a Line ... Set 2

Calculus Practice: Rectilinear Motion

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) $v(t) = -4t^3 + 33t^2$; $s(0) = 0$

2) $v(t) = 4t^3 - 45t^2$; $s(0) = 0$

3) $v(t) = 4t^3 - 30t^2$; $s(0) = 0$

4) $v(t) = 3t^2 - 24t$; $s(0) = 0$

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

6) $v(t) = -4t^3 + 24t^2$; $s(0) = 0$

7) $v(t) = -4t^3 + 39t^2$; $s(0) = 0$

8) $v(t) = -2t + 11$; $s(0) = 26$

9) $v(t) = 4t^3 - 39t^2$; $s(0) = 0$

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

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Answers

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

$$1) \ v(t) = -4t^3 + 33t^2; \ s(0) = 0 \\ s(t) = -t^4 + 11t^3$$

$$2) \ v(t) = 4t^3 - 45t^2; \ s(0) = 0 \\ s(t) = t^4 - 15t^3$$

$$3) \ v(t) = 4t^3 - 30t^2; \ s(0) = 0 \\ s(t) = t^4 - 10t^3$$

$$4) \ v(t) = 3t^2 - 24t; \ s(0) = 0 \\ s(t) = t^3 - 12t^2$$

$$5) \ v(t) = 4t^3 - 42t^2; \ s(0) = 0 \\ s(t) = t^4 - 14t^3$$

$$6) \ v(t) = -4t^3 + 24t^2; \ s(0) = 0 \\ s(t) = -t^4 + 8t^3$$

$$7) \ v(t) = -4t^3 + 39t^2; \ s(0) = 0 \\ s(t) = -t^4 + 13t^3$$

$$8) \ v(t) = -2t + 11; \ s(0) = 26 \\ s(t) = -t^2 + 11t + 26$$

$$9) \ v(t) = 4t^3 - 39t^2; \ s(0) = 0 \\ s(t) = t^4 - 13t^3$$

$$10) \ v(t) = 3t^2 - 26t; \ s(0) = 0 \\ s(t) = t^3 - 13t^2$$

Motion Along a Line ... Set 2

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) $a(t) = -2$; $s(0) = -63$; $v(0) = 16$

12) $a(t) = -12t^2 + 90t$; $s(0) = 0$; $v(0) = 0$

13) $a(t) = 2$; $s(0) = 143$; $v(0) = -24$

14) $a(t) = -12t^2 + 48t$; $s(0) = 0$; $v(0) = 0$

15) $a(t) = 2$; $s(0) = 40$; $v(0) = -14$

16) $a(t) = -2$; $s(0) = 11$; $v(0) = 10$

17) $a(t) = 2$; $s(0) = -84$; $v(0) = -5$

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

19) $a(t) = -6t + 60$; $s(0) = 0$; $v(0) = -225$

20) $a(t) = -2$; $s(0) = 90$; $v(0) = 9$

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Answers

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) $a(t) = -2$; $s(0) = -63$; $v(0) = 16$

$$s(t) = -t^2 + 16t - 63, v(t) = -2t + 16$$

12) $a(t) = -12t^2 + 90t$; $s(0) = 0$; $v(0) = 0$

$$s(t) = -t^4 + 15t^3, v(t) = -4t^3 + 45t^2$$

13) $a(t) = 2$; $s(0) = 143$; $v(0) = -24$

$$s(t) = t^2 - 24t + 143, v(t) = 2t - 24$$

14) $a(t) = -12t^2 + 48t$; $s(0) = 0$; $v(0) = 0$

$$s(t) = -t^4 + 8t^3, v(t) = -4t^3 + 24t^2$$

15) $a(t) = 2$; $s(0) = 40$; $v(0) = -14$

$$s(t) = t^2 - 14t + 40, v(t) = 2t - 14$$

16) $a(t) = -2$; $s(0) = 11$; $v(0) = 10$

$$s(t) = -t^2 + 10t + 11, v(t) = -2t + 10$$

17) $a(t) = 2$; $s(0) = -84$; $v(0) = -5$

$$s(t) = t^2 - 5t - 84, v(t) = 2t - 5$$

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

$$s(t) = -t^4 + 14t^3, v(t) = -4t^3 + 42t^2$$

19) $a(t) = -6t + 60$; $s(0) = 0$; $v(0) = -225$

$$s(t) = -t^3 + 30t^2 - 225t, v(t) = -3t^2 + 60t - 225$$

20) $a(t) = -2$; $s(0) = 90$; $v(0) = 9$

$$s(t) = -t^2 + 9t + 90, v(t) = -2t + 9$$