Calculus Practice: Rectilinear Motion 2a

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

1) $v(t) = 2t - 9$; $s(0) = -22$; at $t = 2$

A) $s(2) = 0$, $v(2) = -6$, $a(2) = 2$
B) $s(2) = -108$, $v(2) = -3$, $a(2) = 2$
C) $s(2) = -36$, $v(2) = -5$, $a(2) = 2$
D) $s(2) = -60$, $v(2) = -4$, $a(2) = 2$

2) $v(t) = 2t - 17$; $s(0) = 72$; at $t = 5$

A) $s(5) = -78$, $v(5) = 7$, $a(5) = 2$
B) $s(5) = -21$, $v(5) = 10$, $a(5) = -2$
C) $s(5) = 12$, $v(5) = -7$, $a(5) = 2$
D) $s(5) = 25$, $v(5) = 0$, $a(5) = -2$

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

A) $s(7) = 2058$, $v(7) = 539$, $a(7) = -42$
B) $s(7) = -1372$, $v(7) = -245$, $a(7) = 126$
C) $s(7) = -1029$, $v(7) = -98$, $a(7) = 168$
D) $s(7) = 1372$, $v(7) = 245$, $a(7) = -126$

4) $v(t) = -3t^2 + 28t$; $s(0) = 0$; at $t = 7$

A) $s(7) = -49$, $v(7) = 35$, $a(7) = 26$
B) $s(7) = -273$, $v(7) = 31$, $a(7) = 34$
C) $s(7) = -98$, $v(7) = 21$, $a(7) = 24$
D) $s(7) = 343$, $v(7) = 49$, $a(7) = -14$

5) $v(t) = -4t^3 + 45t^2$; $s(0) = 0$; at $t = 8$

A) $s(8) = -3072$, $v(8) = -640$, $a(8) = 96$
B) $s(8) = 3584$, $v(8) = 832$, $a(8) = -48$
C) $s(8) = -1024$, $v(8) = 128$, $a(8) = 288$
D) $s(8) = -1536$, $v(8) = -64$, $a(8) = 240$

6) $v(t) = -4t^3 + 36t^2$; $s(0) = 0$; at $t = 7$

A) $s(7) = 686$, $v(7) = -49$, $a(7) = -210$
B) $s(7) = 2744$, $v(7) = 833$, $a(7) = 42$
C) $s(7) = 1715$, $v(7) = 392$, $a(7) = -84$
D) $s(7) = -1372$, $v(7) = -245$, $a(7) = 126$

7) $v(t) = 4t^3 - 33t^2$; $s(0) = 0$; at $t = 5$

A) $s(5) = -750$, $v(5) = -325$, $a(5) = -30$
B) $s(5) = -1125$, $v(5) = -550$, $a(5) = -120$
C) $s(5) = 625$, $v(5) = 250$, $a(5) = 0$
D) $s(5) = 750$, $v(5) = 325$, $a(5) = 30$

8) $v(t) = 2t - 28$; $s(0) = 195$; at $t = 8$

A) $s(8) = 30$, $v(8) = -13$, $a(8) = -2$
B) $s(8) = 35$, $v(8) = -12$, $a(8) = 2$
C) $s(8) = -45$, $v(8) = 12$, $a(8) = 2$
D) $s(8) = -18$, $v(8) = 7$, $a(8) = 2$

9) $v(t) = 3t^2 - 44t + 121$; $s(0) = 0$; at $t = 7$

A) $s(7) = 112$, $v(7) = -40$, $a(7) = -2$
B) $s(7) = 245$, $v(7) = 21$, $a(7) = -18$
C) $s(7) = 28$, $v(7) = -17$, $a(7) = -20$
D) $s(7) = -56$, $v(7) = 55$, $a(7) = 4$

10) $v(t) = -2t + 8$; $s(0) = 20$; at $t = 7$

A) $s(7) = 28$, $v(7) = 3$, $a(7) = -2$
B) $s(7) = -30$, $v(7) = -1$, $a(7) = 2$
C) $s(7) = -10$, $v(7) = -3$, $a(7) = 2$
D) $s(7) = 27$, $v(7) = -6$, $a(7) = -2$

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

11) $a(t) = -2$; $s(0) = 60$; $v(0) = 4$; at $t = 8$

A) $s(8) = -14$, $v(8) = -5$, $a(8) = 2$
B) $s(8) = -12$, $v(8) = 1$, $a(8) = 2$
C) $s(8) = 0$, $v(8) = 14$, $a(8) = 2$
D) $s(8) = 28$, $v(8) = -12$, $a(8) = -2$

12) $a(t) = 6t - 26$; $s(0) = 0$; $v(0) = 0$; at $t = 2$

A) $s(2) = -44$, $v(2) = -40$, $a(2) = -14$
B) $s(2) = -36$, $v(2) = 0$, $a(2) = 14$
C) $s(2) = -12$, $v(2) = 8$, $a(2) = 10$
D) $s(2) = 242$, $v(2) = 77$, $a(2) = -40$

13) $a(t) = 2$; $s(0) = 195$; $v(0) = -28$; at $t = 8$

A) $s(8) = -49$, $v(8) = 0$, $a(8) = 2$
B) $s(8) = 35$, $v(8) = -12$, $a(8) = 2$
C) $s(8) = 0$, $v(8) = -6$, $a(8) = -2$
D) $s(8) = 0$, $v(8) = -15$, $a(8) = -2$

14) $a(t) = -6t + 2$; $s(0) = 0$; $v(0) = 56$; at $t = 2$

A) $s(2) = 162$, $v(2) = 45$, $a(2) = -32$
B) $s(2) = 108$, $v(2) = 48$, $a(2) = -10$
C) $s(2) = -36$, $v(2) = -32$, $a(2) = -10$
D) $s(2) = -52$, $v(2) = -48$, $a(2) = -18$

15) $a(t) = 2$; $s(0) = 165$; $v(0) = -26$; at $t = 2$

A) $s(2) = 117$, $v(2) = -22$, $a(2) = 2$
B) $s(2) = 156$, $v(2) = -25$, $a(2) = 2$
C) $s(2) = 36$, $v(2) = -12$, $a(2) = 2$
D) $s(2) = -56$, $v(2) = 15$, $a(2) = -2$

16) $a(t) = 2$; $s(0) = 135$; $v(0) = -24$; at $t = 3$

A) $s(3) = 120$, $v(3) = -22$, $a(3) = 2$
B) $s(3) = 108$, $v(3) = -21$, $a(3) = 2$
C) $s(3) = -108$, $v(3) = 21$, $a(3) = -2$
D) $s(3) = 72$, $v(3) = -18$, $a(3) = 2$

17) $a(t) = 2$; $s(0) = -48$; $v(0) = -2$; at $t = 8$

A) $s(8) = -10$, $v(8) = -3$, $a(8) = 2$
B) $s(8) = -49$, $v(8) = 14$, $a(8) = -2$
C) $s(8) = 0$, $v(8) = 14$, $a(8) = 2$
D) $s(8) = -12$, $v(8) = 11$, $a(8) = 2$

18) $a(t) = 6t - 22$; $s(0) = 0$; $v(0) = 0$; at $t = 5$

A) $s(5) = -150$, $v(5) = -35$, $a(5) = 8$
B) $s(5) = -180$, $v(5) = 24$, $a(5) = 14$
C) $s(5) = 100$, $v(5) = -40$, $a(5) = -14$
D) $s(5) = 320$, $v(5) = -16$, $a(5) = -22$

19) $a(t) = 6t - 24$; $s(0) = 0$; $v(0) = 0$; at $t = 3$

A) $s(3) = -81$, $v(3) = -45$, $a(3) = -6$
B) $s(3) = -150$, $v(3) = -35$, $a(3) = 16$
C) $s(3) = 363$, $v(3) = 55$, $a(3) = -38$
D) $s(3) = -90$, $v(3) = -51$, $a(3) = -8$

20) $a(t) = -2$; $s(0) = -63$; $v(0) = 16$; at $t = 8$

A) $s(8) = 30$, $v(8) = -1$, $a(8) = -2$
B) $s(8) = 32$, $v(8) = -14$, $a(8) = -2$
C) $s(8) = 1$, $v(8) = 0$, $a(8) = -2$
D) $s(8) = -49$, $v(8) = 0$, $a(8) = 2$

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

1) $v(t) = 2t - 9$; $s(0) = -22$; at $t = 2$

A) $s(2) = 0$, $v(2) = -6$, $a(2) = 2$
B) $s(2) = -108$, $v(2) = -3$, $a(2) = 2$
*C) $s(2) = -36$, $v(2) = -5$, $a(2) = 2$
D) $s(2) = -60$, $v(2) = -4$, $a(2) = 2$

2) $v(t) = 2t - 17$; $s(0) = 72$; at $t = 5$

A) $s(5) = -78$, $v(5) = 7$, $a(5) = 2$
B) $s(5) = -21$, $v(5) = 10$, $a(5) = -2$
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D) $s(5) = 25$, $v(5) = 0$, $a(5) = -2$

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*A) $s(7) = 2058$, $v(7) = 539$, $a(7) = -42$
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C) $s(7) = -1029$, $v(7) = -98$, $a(7) = 168$
D) $s(7) = 1372$, $v(7) = 245$, $a(7) = -126$

4) $v(t) = -3t^2 + 28t$; $s(0) = 0$; at $t = 7$

A) $s(7) = -49$, $v(7) = 35$, $a(7) = 26$
B) $s(7) = -273$, $v(7) = 31$, $a(7) = 34$
C) $s(7) = -98$, $v(7) = 21$, $a(7) = 24$
*D) $s(7) = 343$, $v(7) = 49$, $a(7) = -14$

5) $v(t) = -4t^3 + 45t^2$; $s(0) = 0$; at $t = 8$

A) $s(8) = -3072$, $v(8) = -640$, $a(8) = 96$
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6) $v(t) = -4t^3 + 36t^2$; $s(0) = 0$; at $t = 7$

A) $s(7) = 686$, $v(7) = -49$, $a(7) = -210$
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D) $s(7) = -1372$, $v(7) = -245$, $a(7) = 126$

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B) $s(5) = -1125$, $v(5) = -550$, $a(5) = -120$
C) $s(5) = 625$, $v(5) = 250$, $a(5) = 0$
D) $s(5) = 750$, $v(5) = 325$, $a(5) = 30$

8) $v(t) = 2t - 28$; $s(0) = 195$; at $t = 8$

A) $s(8) = 30$, $v(8) = -13$, $a(8) = -2$
*B) $s(8) = 35$, $v(8) = -12$, $a(8) = 2$
C) $s(8) = -45$, $v(8) = 12$, $a(8) = 2$
D) $s(8) = -18$, $v(8) = 7$, $a(8) = 2$

9) $v(t) = 3t^2 - 44t + 121$; $s(0) = 0$; at $t = 7$

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C) $s(7) = 28$, $v(7) = -17$, $a(7) = -20$
D) $s(7) = -56$, $v(7) = 55$, $a(7) = 4$

10) $v(t) = -2t + 8$; $s(0) = 20$; at $t = 7$

A) $s(7) = 28$, $v(7) = 3$, $a(7) = -2$
B) $s(7) = -30$, $v(7) = -1$, $a(7) = 2$
C) $s(7) = -10$, $v(7) = -3$, $a(7) = 2$
*D) $s(7) = 27$, $v(7) = -6$, $a(7) = -2$

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

11) $a(t) = -2$; $s(0) = 60$; $v(0) = 4$; at $t = 8$

A) $s(8) = -14$, $v(8) = -5$, $a(8) = 2$
B) $s(8) = -12$, $v(8) = 1$, $a(8) = 2$
C) $s(8) = 0$, $v(8) = 14$, $a(8) = 2$
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12) $a(t) = 6t - 26$; $s(0) = 0$; $v(0) = 0$; at $t = 2$

*A) $s(2) = -44$, $v(2) = -40$, $a(2) = -14$
B) $s(2) = -36$, $v(2) = 0$, $a(2) = 14$
C) $s(2) = -12$, $v(2) = 8$, $a(2) = 10$
D) $s(2) = 242$, $v(2) = 77$, $a(2) = -40$

13) $a(t) = 2$; $s(0) = 195$; $v(0) = -28$; at $t = 8$

A) $s(8) = -49$, $v(8) = 0$, $a(8) = 2$
*B) $s(8) = 35$, $v(8) = -12$, $a(8) = 2$
C) $s(8) = 0$, $v(8) = -6$, $a(8) = -2$
D) $s(8) = 0$, $v(8) = -15$, $a(8) = -2$

14) $a(t) = -6t + 2$; $s(0) = 0$; $v(0) = 56$; at $t = 2$

A) $s(2) = 162$, $v(2) = 45$, $a(2) = -32$
*B) $s(2) = 108$, $v(2) = 48$, $a(2) = -10$
C) $s(2) = -36$, $v(2) = -32$, $a(2) = -10$
D) $s(2) = -52$, $v(2) = -48$, $a(2) = -18$

15) $a(t) = 2$; $s(0) = 165$; $v(0) = -26$; at $t = 2$

*A) $s(2) = 117$, $v(2) = -22$, $a(2) = 2$
B) $s(2) = 156$, $v(2) = -25$, $a(2) = 2$
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16) $a(t) = 2$; $s(0) = 135$; $v(0) = -24$; at $t = 3$

A) $s(3) = 120$, $v(3) = -22$, $a(3) = 2$
B) $s(3) = 108$, $v(3) = -21$, $a(3) = 2$
C) $s(3) = -108$, $v(3) = 21$, $a(3) = -2$
*D) $s(3) = 72$, $v(3) = -18$, $a(3) = 2$

17) $a(t) = 2$; $s(0) = -48$; $v(0) = -2$; at $t = 8$

A) $s(8) = -10$, $v(8) = -3$, $a(8) = 2$
B) $s(8) = -49$, $v(8) = 14$, $a(8) = -2$
*C) $s(8) = 0$, $v(8) = 14$, $a(8) = 2$
D) $s(8) = -12$, $v(8) = 11$, $a(8) = 2$

18) $a(t) = 6t - 22$; $s(0) = 0$; $v(0) = 0$; at $t = 5$

*A) $s(5) = -150$, $v(5) = -35$, $a(5) = 8$
B) $s(5) = -180$, $v(5) = 24$, $a(5) = 14$
C) $s(5) = 100$, $v(5) = -40$, $a(5) = -14$
D) $s(5) = 320$, $v(5) = -16$, $a(5) = -22$

19) $a(t) = 6t - 24$; $s(0) = 0$; $v(0) = 0$; at $t = 3$

*A) $s(3) = -81$, $v(3) = -45$, $a(3) = -6$
B) $s(3) = -150$, $v(3) = -35$, $a(3) = 16$
C) $s(3) = 363$, $v(3) = 55$, $a(3) = -38$
D) $s(3) = -90$, $v(3) = -51$, $a(3) = -8$

20) $a(t) = -2$; $s(0) = -63$; $v(0) = 16$; at $t = 8$

A) $s(8) = 30$, $v(8) = -1$, $a(8) = -2$
B) $s(8) = 32$, $v(8) = -14$, $a(8) = -2$
*C) $s(8) = 1$, $v(8) = 0$, $a(8) = -2$
D) $s(8) = -49$, $v(8) = 0$, $a(8) = 2$