Motion Along a Line Revisited

A particle moves along a coordinate line. Its velocity function is \( v(t) \) for \( t \geq 0 \). For each problem, find the position function \( s(t) \). You may use the blank graphs to sketch \( s(t) \) and \( v(t) \).

1) \( v(t) = 3t^2 - 22t; \quad s(0) = 0 \)

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 \( v(t) \). You may use the blank graphs to sketch \( s(t) \), \( v(t) \), and \( a(t) \).

2) \( a(t) = -12t^2 + 60t; \quad s(0) = 0; \quad v(0) = 0 \)
A particle moves along a coordinate line. Its acceleration function is \( a(t) \) for \( t \geq 0 \). For each problem, find the position, velocity, speed, and acceleration at the given value for \( t \). You may use the blank graphs to sketch \( s(t) \), \( v(t) \), and \( a(t) \).

3) \( a(t) = -12t^2 + 72t; \ s(0) = 0; \ v(0) = 0; \) at \( t = 5 \)

A particle moves along a coordinate line. Its acceleration function is \( a(t) \) for \( t \geq 0 \). For each problem, find the displacement of the particle and the distance traveled by the particle over the given interval. You may use the blank graphs to sketch \( v(t) \) and \( a(t) \).

4) \( a(t) = 6t - 48; \ v(0) = 144; \ 1 \leq t \leq 8 \)
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1) \( v(t) = 3t^2 - 22t; \ s(0) = 0 \)

\[
s(t) = t^3 - 11t^2
\]

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 \( v(t) \). You may use the blank graphs to sketch \( s(t) \), \( v(t) \), and \( a(t) \).

2) \( a(t) = -12t^2 + 60t; \ s(0) = 0; \ v(0) = 0 \)

\[
s(t) = -t^4 + 10t^3, \ v(t) = -4t^3 + 30t^2
\]
A particle moves along a coordinate line. Its acceleration function is \( a(t) \) for \( t \geq 0 \). For each problem, find the position, velocity, speed, and acceleration at the given value for \( t \). You may use the blank graphs to sketch \( s(t) \), \( v(t) \), and \( a(t) \).

3) \( a(t) = -12t^2 + 72t; \quad s(0) = 0; \quad v(0) = 0; \quad \text{at } t = 5 \)

\[ s(5) = 875, \quad v(5) = 400, \quad \text{speed at } 5 = 400, \quad a(5) = 60 \]

A particle moves along a coordinate line. Its acceleration function is \( a(t) \) for \( t \geq 0 \). For each problem, find the displacement of the particle and the distance traveled by the particle over the given interval. You may use the blank graphs to sketch \( v(t) \) and \( a(t) \).

4) \( a(t) = 6t - 48; \quad v(0) = 144; \quad 1 \leq t \leq 8 \)

Displacement: 7
Distance traveled: 263