

## Particle Motion #2

A particle moves along a horizontal line. Its position function is  $s(t)$  for  $t \geq 0$ . For each problem, find the velocity function  $v(t)$ , the times  $t$  when the particle changes directions, and the intervals of time when the particle is moving left and moving right.

1)  $s(t) = -t^3 + 24t^2 - 144t$

2)  $s(t) = -t^3 + 22t^2 - 105t$

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

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

A particle moves along a horizontal line. Its position function is  $s(t)$  for  $t \geq 0$ . For each problem, find the acceleration function  $a(t)$ , the times  $t$  when the acceleration is 0, and the intervals of time when the particle has  $a > 0$  and when it has  $a < 0$ .

5)  $s(t) = -t^3 + 12t^2$

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

7)  $s(t) = -t^4 + 12t^3$

8)  $s(t) = -t^4 + 15t^3$

A particle moves along a horizontal line. Its position function is  $s(t)$  for  $t \geq 0$ . For each problem, find the velocity function  $v(t)$ , the acceleration function  $a(t)$ , the times  $t$  when the particle changes directions, the intervals of time when the particle is moving left and moving right, the times  $t$  when the acceleration is 0, and the intervals of time when the particle *has  $a > 0$*  and *when it has  $a < 0$* .

9)  $s(t) = -t^3 + 4t^2 + 60t$

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