ICM Name_____ ID: 1

Related Rates/Particle Motion

Date_____ Period____

Solve each related rate problem.

1) A hypothetical square grows so that the length of its diagonals are increasing at a rate of 4 m/min. How fast is the area of the square increasing when the diagonals are 8 m each?

2) A spherical snowball is rolled in fresh snow, causing it to grow so that its radius increases at a rate of 4 in/sec. How fast is the volume of the snowball increasing when the radius is 4 in?

3) A hypothetical square grows so that the length of its sides are increasing at a rate of 4 m/min. How fast is the area of the square increasing when the sides are 11 m each?

4) Oil spilling from a ruptured tanker spreads in a circle on the surface of the ocean. The radius of the spill increases at a rate of 8 m/min. How fast is the area of the spill increasing when the radius is 5 m?

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

5) $s(t) = t^3 - 8t^2$

6) $s(t) = t^3 - 16t^2 + 64t$

A particle moves along a horizontal line. Its position function is $s(t)$ for $t \geq 0$. For each problem, find the displacement of the particle and the distance traveled by the particle over the given interval.

7) $s(t) = t^2 - 5t - 50;\ 0 \leq t \leq 5$

8) $s(t) = -t^2 + 14t - 13;\ 6 \leq t \leq 12$